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TWENTY-FIFTH ANNUAL REPORT
OF THE
Illinois State Beekeepers'
Association

**Organized February 26, 1891, at
Springfield, Illinois**



Compiled by
G. H. CALE
Hamilton, Illinois

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LETTER OF TRANSMITTAL.

OFFICE OF THE SECRETARY.

HAMILTON, ILLINOIS, May 1, 1926.

To His Excellency, Len Small, Governor of the State of Illinois.

SIR: I have the honor to transmit herewith the Twenty-fifth Annual Report of the Illinois State Beekeepers' Association.

G. H. CALE, Secretary.

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TWENTY-FIFTH ANNUAL REPORT
OF THE
Illinois State Beekeepers' Association
For 1925

OFFICERS OF ILLINOIS STATE BEEKEEPERS' ASSOCIATION FOR 1926.

DR. A. C. BAXTER	Springfield	President
A. L. KILDOW	Putnam	Inspector of Apiaries
E. A. JOHNSON	Peoria	Vice President
W. H. FORCE	Champaign	Vice President
W. H. GALEENER	Vienna	Vice President
A. G. GILL	Chicago	Vice President
GLEN GLASS	Cameron	Vice President
ELMER KOMMER	Woodhull	Treasurer
G. H. CALE	Hamilton	Secretary

List of members in back of report. Also index.

President's Annual Address
TWO YEARS AGO AND THE PRESENT.
(By J. R. Wooldridge.)

Chicago, November 24, 1925.

When we stop and think what our Association was doing for the beekeepers of the State two years ago, and what it is now doing we cannot help but realize and know that many things have come about benefiting the beekeepers through the efforts of the membership and Officers of the State Association.

Two years ago when I was chosen President of your Association I found a charter with only a few members, about one-fourth of the counties in the State organized and little interest manifested by any of the counties unorganized—but now see what we have—almost one-half the counties organized, members enthusiastic, more activity than was ever known, and, best of all, a strong desire to learn the best methods of beekeeping and willing to help themselves, which means a greater production and success.

The State Association Treasury had a small amount of funds available, had no unpaid debts, but not enough funds to do anything with in the way of promoting new business. The State appropriation fund was much larger, but was almost completely exhausted, with over \$800.00 worth of vouchers unpaid and no funds available; however, this deficit has been overcome in various ways and at the close of the Biennial period, June 30, 1925, we find the Association free of debt with all current vouchers allowed for, and we closed with \$1.65 to our credit, which, of course, reverted to the State Treasury and is no longer available.

This left the State Association free of all incumbrances to start on the 1925 appropriation, available July 1, 1925, with all current bills vouchered to date.

At the time of taking office two years ago, I accused the State Association of being indifferent and on the stool of "do nothing" and failing to function as an Association should, and I appealed to all the Officers, Members and Beekeepers in general for full cooperation in bringing the work of the Association up to standard. This harsh accusation caused the beemen of the State to stop and think. They realized the accusation was harsh, but just, and they proposed to correct it by becoming active, and I am pleased to say their activities have borne wonderfully. Just see what they have accomplished with no great effort. The establishment of a full course in beekeeping at the University of

Illinois with a two day short course for the more experienced beekeeper to attend who desires all the latest information relative to the Industry. The State Association during this time established four other two day short courses, two of the four being held in southern Illinois, and the other two being held in northern Illinois under the guidance of the most up-to-date authorities in beekeeping of the day.

This arrangement practically serves all of the beekeepers of the State desiring to avail themselves of this privilege and all free to them. These short courses, six in number, are the first ever held in the history of Illinois.

The County Associations have increased largely until nearly one-half of the counties in the State are organized with many other counties clamoring for help to organize. I might add that had there been funds sufficient and available for this purpose to pay me a daily wage during this time the whole State practically could have been organized by this time. I now have a large list of unorganized counties asking the State Association for help to organize.

Many series of field meets have been held with good speakers and good attendance throughout the State, with many other counties asking for similar help unprovided for on account of lack of speakers and finances to carry this work forward, and in my opinion, this is one of the best ways to enlighten the interested beekeepers throughout the State by giving them the opportunity and a chance to hear and see for themselves the demonstration of handling live bees by those who know, and should be pushed to the limit.

The task of establishing demonstrative apiaries equally throughout the State under the care of our University has been badly retarded on account of the lack of the necessary funds, but it is to be hoped that our University in the near future will provide for our Industry as well as they do for many other agricultural industries of the State, in the most scientific way known.

Why should the beekeeper be forgotten because he does not demand of the University his just right and until you do come in force and demand recognition you must take a back seat and keep still.

As a matter of information I will say at no time in the history of our Grand Old State have the Administrative bodies listened to the bitter cries of the beekeeperes of the State as they do now. This assertion is well borne out by remembering what the 54th Assembly of Legislators did when they set aside \$36,500.00 for inspection of apiaries to eradicate the State of American Foulbrood and save our Industry.

This is especially so of the Division of Agriculture which Director S. J. Stanard heads. He actually seems to be one of us by being willing to extend the helping hand at any time possible

for him to do so. Indeed, the beekeepers have reason to be thankful in having Director S. J. Stanard for our leader.

The State Association now enjoys the greatest membership in its history. It also has more activity, more cooperative spirit, with the brightest future ever known, and can be made a wonderful power in the State if correctly handled, and bring to the beekeepers of the State their just right. Through the efforts of the State Association and the beekeepers in general they have placed Illinois ahead of any State in the Union as to the amount of appropriation of \$36,500.00 for inspection of apiaries to free Illinois of American Foulbrood.

Thanks to our generous Legislative people for listening to our tale of woe and especially is this so of Representative Walter R. Miller and Senator Richard R. Meents. Oh! How they did work for the beekeepers and the beekeepers owe them a great debt of gratitude in going to the front for us. Now, will the beekeepers of Illinois do their part?

When you look back over the past two years and note what has been accomplished with such small funds available it behooves the Association to provide an increased revenue for the unavoidable running expenses of the Association, and the yearly dues should be placed at \$2.50 per annum. No other organization in the State has such small dues and no organization has so small a fund to do with.

The State Association business has largely increased in every way in the past two years and from my office alone in the last year there was more than 6,000 pieces of mail forwarded, which requires much time, thought and energy.

Now that we have assembled in our friendly annual convention to discuss and select the Officers for the ensuing year, let us bury all petty grievances and work undividedly for the greatest amount of good to all.

Now, that I leave the office of President cheerfully, it is to be hoped that my successor will be full of "pep" and push the good work on now that the foundation is well formed.

Thanking one and all for the honor bestowed and cooperation given me during my Administration.

ANNUAL REPORT OF SECRETARY.

(By M. G. Dadant.)

My report as Secretary of the Illinois State Beekeepers' Association for this season, naturally covers only the eight months period, extending from December, 1924, to August 1, 1925. Owing to illness and pressing work along other lines, it became necessary for me to resign the Secretaryship of the Association, much to my regret.

In the eight months in which I exercised the office of Secretary, I can say that what was accomplished was in no measure due to the activity of the Secretary of the Association, but was due to the fact that beekeepers everywhere in Illinois, were striving in themselves to make the Illinois State Beekeepers' Association a real active association, accomplishing results.

In other words, beekeeping organizations have been "hitting their stride" in Illinois, and acceding to the cooperative efforts, without which no association, we believe, can succeed.

As a general plan, the Illinois Association has been pursuing the policy of division of the State into five different districts, each of which was overseen by a Vice President of the Illinois Beekeepers' Association.

These divisions in turn, were divided along county lines and the impetus was given wherever possible for the organization of beekeepers into County Associations for the most efficient procedure.

To my mind, the County organization plan is the very best one for several reasons. In the first place, County beekeepers know each other fairly well and are able to select officers who are able to realize the problems of each county association and furthermore, are able to select deputies to a State Association meeting who can intelligently represent their section of the State.

Furthermore, County Associations can recommend deputies as inspectors for bee diseases and can give their very best cooperation to holding to a minimum the expenses of such deputies in performing their work of inspection in the different counties so organized.

Nor do we have to accede to a merely rough statement to know that the county form of organization is the proper one for Illinois, because it really has succeeded. Bear in mind that there are now over thirty county associations in Illinois, all functioning in a good manner and all of them recommending deputies to State Bee Inspector A. L. Kildow.

Not only have the county associations performed this work, but they have been the means of educating beekeepers in the different counties in proper methods of handling bees, proper methods of marketing, proper methods of handling disease, and in many other ways urged a cooperative effort.

To my mind, the continued decrease in disease in the State of Illinois, is largely due to the efforts of the county associations working in close cooperation with the good work of the Chief Inspector for combatting the disease. We must bear in mind that four years ago, the percentage of disease in Illinois was fourteen per cent, whereas it has shrunk during 1925 to a mere four per cent among the forty thousand or more colonies which were inspected.

It becomes difficult to look into the future and try to visualize what the outcome of the Illinois State Beekeepers' Association will be in Illinois, but undoubtedly if the present progress continues and the present cooperative efforts of the County organizations is not restricted through sectional differences, we can see no reason why the prosperity of the Association should not continue.

Undoubtedly, the associations in themselves as well as individual beekeepers, are wielding a strong influence on appropriations which are secured from our State Legislature. In other words, by cooperative effort, we can make our Legislators see that we really need funds for combatting disease and for extension work.

As a last remark, let me say that the appointment of Mr. V. G. Milum for both extension and teaching in Illinois, I believe is going to have a marked influence also, because Mr. Milum, I hope, will be available for extension work throughout the State, whereas previously, such calls had to be answered by voluntary services of different members of the Illinois State Beekeepers' Association organization or by calls for help to the different bee journals or supply companies.

Extension in itself, is a very valuable adjunct to proper disease control, since it makes for better beekeepers everywhere.

MINUTES OF THE 25TH ANNUAL MEETING OF THE ILLINOIS STATE BEEKEEPERS' ASSOCIATION, SPRINGFIELD, ILL., DECEMBER 8-9, 1925.

Meeting called to order by President J. R. Wooldridge, 9:30 A. M. Minutes of the last meeting read and approved.

Papers were read or addresses made by the following persons: J. R. Wooldridge, Prof. A. G. Milum, Prof. G. H. Cale, J. I. Hambleton, of the Division of Bee Culture at Washington, D. C., Geo. Demuth, Editor of "Gleanings," C. P. Dadant, Editor of "American Bee Journal."

Report of Treasurer read and on recommendation of the auditing committee, approved.

Report of State Bee Inspector A. L. Kildow read and approved.

Moved and seconded that a vote of thanks be extended to the Governor, Hon. Len Small, for the loan of \$1,800.00 last June, until our appropriation became available. Carried.

Motion made and carried that the secretary be instructed to write to Dr. Philips conveying the regards of the Illinois Beekeepers, to be read before the Apis Club in England.

Motion made and carried that the work of A. L. Kildow as State Inspector be approved.

Motion made and carried that the dues of this Association remain as they are: \$1.50, or \$1.75 with a bee paper.

Mr. A. L. Kildow requested the secretary to notify the members thirty days in advance of the next meeting, so that there may be an opportunity to vote on any changes in the Constitution that may be desired.

The following were elected to office:

President, Dr. A. C. Baxter; Secretary, G. H. Cale; Treasurer, Elmer Kommer; First Vice President, E. A. Johnson; Second Vice President, W. H. Force; Third Vice President, W. K. Galeener; Fourth Vice President, A. G. Gill; Fifth Vice President, Glen Glass.

There being no further business the meeting adjourned, subject to the call of the executive committee.

LEWIS R. ALLEN, *Secretary Pro Tem.*

RESOLUTIONS APPROVED AND ADOPTED AT THE ANNUAL MEETING, DECEMBER 8, 1925.

1.

BE IT RESOLVED, That the Illinois State Beekeepers' Association in Convention assembled, December 8th and 9th, at Springfield, Illinois, express its appreciation of the support given by the Governor and the Department of Agriculture of Illinois in advancing \$1,800 to carry on our work, and we extend our thanks to them for their continued and effective cooperation.

2.

BE IT RESOLVED, That this Committee extend its thanks to M. G. Dadant, Dr. A. C. Baxter, and all others who have so freely given of their time and efforts in securing the state appropriation now in effect and that appreciation be extended to any who have made special efforts to build up the bee industry in Illinois.

3.

BE IT RESOLVED, That the Association extend a vote of thanks to the officers who have so faithfully served it during the past year and all who have taken part in the program of this Convention for their instructive talks.

4.

BE IT FURTHER RESOLVED, That this Association express its thanks to the management of the Hotel St. Nicholas for the use of its parlors and for all the courtesies rendered the Association in the past.

5.

BE IT RESOLVED, That this Association request the State Legislature to pass a law requiring all bee owners to register the number of their colonies and their location with the Department of Agriculture of the State once a year between March 1st and April 20th, such law to provide for the collection of a cash penalty for failure to register.

2nd. That no bees be permitted to enter the State without a certificate of Inspection from the State Inspector of the state from which the bees are sent.

3rd. That no bees be moved from one locality to another without a permit from the Chief Inspector or one of his Deputies.

4th. That this Association advocates the eradication of all box hives, gums, or any other receptacles to house bees, other than moveable frame hives.

SCHOOL CHILDREN AND THEIR INTEREST IN BEES AND HONEY.

(By V. G. Milum, *University of Illinois.*)

It is a well established fact that the ideas that one learns in his early years are those that he carries along with him over a longer period of time than those obtained in later life. The things we learn when we are youngsters have the greatest appeal to us. If this is true, would not it be a good plan for every beekeeper to start upon a campaign of educating our American youngsters of the value of honey as a food. But suppose such a thing were accomplished, the good results would be much further extended, for many are the facts and ideas that are brought before the American grown-ups by the education of their children who are the inspiration of every good American home. It then would not be many years before a lot of the false ideas regarding honey, nature's only original sweet, not man made, would be a thing of the past, and the demands for it would be constantly increasing.

How are we to accomplish this end? Every beekeeper has a wonderful opportunity in his community. This is by implanting ideas of bees and honey in the minds of the school children through the medium of the public school. Let us consider some of the ways in which it may be accomplished. In connection with National Honey Week, State Honey Week, or County Honey Week, or at any other time, permission usually can be obtained to give talks before various groups of school children. During any special times the school principals should be notified in advance that a speaker will be furnished upon request. Almost all teachers or principals are glad to have speakers on such interesting subjects as "Bees and Honey."

In preparation for such prospective talks the speaker should be sure that he knows his subject thoroughly in order that he will be able to answer all questions asked. In some cases, it may be best to have the material written out, but usually more interest is secured if the speaker does not read from a paper. Where the beekeeper does not wish to give the talk himself, he can easily instruct one or more of the pupils so that they may give an interesting discussion before their fellow students. (Suitable material for such talks can be secured by writing to the Beekeeping Division, University of Illinois, Vivarium Building, Champaign, Illinois). Each speaker should be provided with an observation hive and samples of honey, in order to make the talks more effective, for in talking to children or even to older people, it is always a good plan to have the subject material

before them, because their attention can be held more easily. In these talks, the organization and activity of the colony should be covered thoroughly, followed by the production of honey step by step with an explanation of the difference between comb and extracted honey production. This gives opportunity to explain the changes brought about in honey by the ripening process, explaining that the more complex sucrose or cane sugar is broken up into dextrose or grape sugar and levulose or fruit sugar, which simple sugars are more easily digested by the human body than ordinary cane sugar. The care of honey should be explained with careful directions for liquifying granulated honey. However, in talking of granulated honey, one should always explain the true causes of granulation and encourage the use of honey in the granulated or crystallized form. When we have educated the public to use granulated honey, its consumption will be increased and one of the beekeepers most serious problems will be solved. If the beekeeper gives the talk himself, he should not mention the fact that he has honey for sale; his knowledge of the subject will indicate that and direct any prospective customers toward him.

There is opportunity for such talks on Bees and Honey as outlined at Civic League programs, opening exercises in graded and high schools, and in the Community Meetings, which are becoming quite popular in many sections of the country. Here is what one enthusiastic beekeeper did in his own school district. On the last day of school in connection with a district picnic, the children gave a program which was entirely about bees and honey. Certainly such an event should plant ideas of the value and importance of honey as a food. The beekeeper can furnish bee and honey exhibits to schools where he cannot give an actual demonstration or talk on the subject. An observation hive set up in a school window for a few days, along with an educational honey exhibit would go a long ways toward directing customers toward the exhibitor. In some schools, the industries of the locality are studied by the children in their geography classes. Beekeeping is important! Honey production is one of the leading industries. Why shouldn't it be studied along with the others? Here is the beekeeper's opportunity to furnish the bee and honey exhibit, together with pictures and descriptive material, which can be made an interesting source of study.

Another wonderful opportunity to advertise honey in the schools is in connection with the courses in domestic science which are now taught in practically all graded and high schools. The beekeeper can send or give the teacher a booklet on the use of honey in cooking and then send along a pail of honey with a suggestion that it be used for that purpose. Most teachers would be glad to spend some time using honey in cooking and making candies. There is no doubt that the result would bring more customers to the beekeeper. And when the girls in the cooking class are serving waffles to the parents, teachers or the school

board, why not have your honey served with those waffles. Advertising? Yes! Or with the hot lunches served by so many county schools and some city schools. In such cases an occasional donation will receive due credit and if the honey is good honey it will be well repaid for.

Another idea is that of offering honey as prizes at school fairs and other competitive exhibits. When the committees in charge of such affairs ask for donations from the business men to be used as prizes they never think of asking the beekeeper about donating a prize. If the beekeeper is not a business man he should be. And what would be nicer as a prize in some contest than a nice pail of "Pure Illinois Honey" produced by C. A. Beeman, Honeyville, Illinois. And remember, when the list of prizes is published in the local paper, the names of the persons or firms making the donations are always published. Is not that advertising, and advertising that will pay dividends?

All of these suggestions have been given with the idea of indicating ways of getting facts of bees and honey before the children; with developing within their minds the value and deliciousness of honey as a food. Once that the children are firmly convinced, total conviction will soon follow, for what parents are there that do not listen to a more or less degree to the wishes of their children.

Some of these ideas could be used by a county beekeepers association in the cooperative marketing of the honey crop of its members. Of course, there are many other ways of getting the idea of "Honey as a Food" before the minds of the people, which can be worked out by a small group of wide-awake beekeepers who are concentrated in an area not larger than that represented by the average county in the State of Illinois. This avenue of education is only one of many possibilities. The group of beekeepers who, with a little teamwork, put the idea across will get the reward. It will benefit the whole group by building up a market besides giving the pleasures desired from the cooperation and friendship of fellow beekeepers. Will it not be worth a little unified effort?

SOME BEEKEEPING EXPERIENCE.

(By C. P. Dadant.)

I am requested, by our President, to give an address on the above question. It is a very liberal subject, which may embrace almost anything in the experience of a beekeeper.

I have concluded that the best question I can bring forward is one on which there is not enough light, the diseases of the adult bees. We have all heard the description of the diseases of the brood and they have been studied so as to diagnose them fairly, but the diseases of the mature bee are still enveloped in more or less mystery.

My first experience with the diseases of the adult bee was, I believe, in 1879, when after a hard winter, we lost a number of colonies from what it is common to name "spring dwindling." The appearance of the bees is easy to describe. Their abdomens are loaded with fecal matter, they drag themselves about, some of them discharge the contents of their abdomen within the hive, or around the entrance, while others are unable to discharge the load of feces and drag about in a paralyzed manner until they finally die. Even queens die of spring dwindling, although they are likely to survive until the colony becomes too weak to keep up the necessary warmth.

In the case I have just mentioned, it was not difficult to diagnose the cause of the disease. Bad honey, honeydew and fruit juices harvested the previous season, could account for all the trouble. The bees, confined to the hive a long time during the cold weather, had become sick with diarrhea, or dysentery as some people call it, and had discharged the fecal matter within the hive or at the entrance because they were no longer able to withhold it. Those that had been able to retain it, in many cases were afflicted with what we saw fit to call "constipation" or entire disability to void the feces. In those cases, they went about partly paralyzed, dragging themselves about at the top of the combs, their bodies shining, their abdomens congested. Many dragged themselves to the outside and died there. In some cases, the disease appeared to become epidemic, as it lasted, clear into May and once or twice till June. Old beekeepers called this "the May disease." The May disease is not confined to the United States, but is known all over the world, in Germany as "Maikrankheit," in France as "Mal de Mai," in Italy as "Mal di Maggio."

But here comes a question. This May disease which, in our case, appeared to be a result of constipation, after the unhealthy

consumption of bad stores, appears in different countries with about the same symptoms, but ascribed to many various causes. It was found in Florida, by a very practical beekeeper, O. O. Poppleton, who had practiced beekeeping in Iowa and spent years along the east coast of Florida. It was found in California, and described to me by Major Merriam, of San Marcos. Each of those men ascribed the disease to different causes, the cause described by Poppleton not existing in California.

Worse yet, a similar disease, with almost entirely similar diagnosis was found in Italy, in the vicinity of Ancona, along the Adriatic, where there is practically no more winter than there is in Florida or in Southern California.

In the British Isles, the "Isle-of-Wight disease" is very similar to the troubles already mentioned. The damp, unpleasant weather of spring in that country would almost explain the trouble. But it becomes epidemic and destroys colonies long after the causes would appear to have been removed. In Great Britain, the Isle-of-Wight disease destroyed the bees of entire sections of the country, a few years ago.

The German scientists discovered a microscopic parasite in the stomach of the honeybee, which they called "*Nosema apis*." The trouble was ascribed to this parasite. But healthy bees were found carrying quite a number of them, while some diseased bees had none. In England a mite, "*Acarapis woodi*," also called "*Tarsonemus woodi*," which invades the breathing tubes of the honeybee, was charged with being the cause of the Isle-of-Wight disease. It is thought to be almost a proved fact. But there has been no *Tarsonemus* found in America, according to our scientists, and they have put an embargo on the importation of bees, to prevent its introduction. Then what will we say about the disease, or diseases, found in so many different parts of the country, with so similar diagnosis to that of the Isle-of-Wight trouble?

When I visited Italy, in the summer of 1913, I met many beekeepers in the Province of Ancona. They were, most of them, positive that the disease, which they called *Mal-di-Maggio*, and which was still showing in a few instances, in September, was caused by the blossoms of red-hawthorn (*Crataegus*). But there is no hawthorn in Florida, where Poppleton found the disease, and the hawthorn of Illinois blooms long after the beginning of the trouble. Then what is the cause of the disease?

Moreover, we have had, here, in Illinois, temporary troubles of a similar nature, which we cannot as yet ascribe to anything. During the month of June, 1924, my son Louis, whose home is the old Dadant home, and who has the home apiary in charge, called my attention to a number of bees dragging themselves on the ground, just as if suffering with disease. They would walk about and try to fly and would finally gather into small knots of a dozen bees or so, on blades of grass, as if in misery. This

was during a fine warm day, when everything appeared favorable.

The next day, I called him up by telephone, from my own home in town, to inquire about the trouble. The sick bees had disappeared and nothing of the kind was detected during the rest of the season.

I could write for days upon this matter, but would bring no light whatever. Yet there is a solution. There must be a number of diseases with almost entirely similar diagnosis. But their causes, in most instances, are unknown to us. It remains for the young beekeepers, the young scientists, with the acquired knowledge of their elders, to push investigations farther along.

There is no doubt in my mind that a number of different causes bring similar results. Bad winter food, in countries of cold winters, is without doubt responsible for much of the difficulty. The *Nosema apis* and the *Tarsonemus woodi* probably bear their share of the troubles found. But what is it that causes disease of the adult bee where none of these troubles appear?

It is very difficult to bring about progress, even with the acquired knowledge of others to help us. The reason is that many of the so-called discoveries are incorrect. Take for instance the cause of what is called European foulbrood. Cheshire ascribed it to a bacillus which he called "*Bacillus alvei*." But our own scientist, Dr. White, found and proved that *Bacillus alvei* was only a bacillus of putrefaction, which invaded the cells after the death of the larvae from *Bacillus pluton*. That explained why there was disagreement upon the odor of what we call European foulbrood. Some claimed that it was a stinking foulbrood, while others asserted that this disease had only a sour odor. It was only the date of examination which made the difference. Just as soon as the larvae died, when the only bacillus developed was *Bacillus pluton*, the odor was sour; but just as soon as the bacillus of putrefaction "*Bacillus alvei*" developed in the dead brood, there was a carrion odor and the disease was called "stinking foulbrood," a term still used by many of our contemporary writers, to describe European foulbrood.

So it will be necessary to be very careful in trying to diagnose between the different diseases. It will take minute investigations and much microscopic research. I wish I had my life to live over and be able to study such things, for we are only on the threshold of the study of all sorts of diseases. Mankind has solved several difficult problems, one of which is the prevention of yellow fever, by destroying the *Stegomya* that causes it. So, we must not be discouraged by difficulties, but go on with scientific researches with probability of success.

WAYS OF DECREASING COSTS OF SELLING HONEY.

(By H. H. Root.)

Hoover has given us a splendid rule to follow: "Sell produce as near the point of production as possible." Does it make any difference, so long as the buyer pays the freight? I don't know of any greater fallacy than that. The buyer does not pay the freight; neither does he pass the freight on to the consumer. The *seller* pays the freight.

Last summer I attended a state meeting in northern Michigan and the gentleman who took me from that meeting to Gaylard, Michigan, where I was to take my train that evening, told me that he had several tons of honey to sell and asked if I would not buy it. I told him I thought it would be more profitable for him to sell his honey close by. Day before yesterday I heard from him, telling me that he had disposed of all his honey in his own state for several cents a pound more than I could have paid him. There are plenty of places in the United States where honey is shipped at an expense of 2, 3, and 3½¢ per pound for carrier charges. It is a very short road to eliminating cost of selling if we bear Hoover's splendid rule in mind and remember that selling locally decreases the cost of selling. I could spend an hour giving you illustrations of people who have sold their honey to very good advantage close by. J. A. Green, Colorado, in a small town, has sold almost his entire crop right there in that town. He didn't start out and sell the crop in one morning. Of course not—it took years, and that is what I want to talk about here for just a few minutes.

Mr. Nordman has said here, that, no cooperative society in existence can successfully fix a price above a fair average market price. In substance that is what he said, and that is absolutely true. The prevailing average price can be raised, not at once, but over a period of time. It is folly for any one of us to think that he can sell his own individual honey for away above the market price except on reputation, and get away with it year after year.

In Iowa, I made the statement that the average beekeeper will talk your arm off on bees but on honey he is silent. I don't hear any one talking about the food value of honey. We are apt to talk about bees, forgetting honey. I wonder if any two or three men in Wisconsin are doing the amount of good in preaching the gospel of honey that Miss Fischer is doing in her wonderful work. I wonder if we men are doing what we might do along that line—we ought to do it.

May the Association live long and prosper. It seems to me that the Association may function beautifully along this line, not only in cooperative selling, but in cooperative publicity. The final aim of all associations should be to have affiliated county associations that can work with a common purpose in telling the ignorant and indifferent public about our product. It seems to me that there is not an association in the United States, regardless of how small, that should not have a publicity committee of perhaps one person who can see to it that frequent articles are written and sent to local papers. These articles ought to be accompanied occasionally with some true advertising, paid for either by the Association or its members. In the Nebraska Association there is one fertile brained man who has had hundreds of honey articles accepted. Newspapers are anxious to get them. I am sure that the "American Bee Journal" and "Gleanings" will render assistance along these lines and will furnish data from which articles can be written.

Today we are able to talk over the radio on honey. R. B. Wilson, New York, has given several talks on honey over the radio and says it is not at all difficult to arrange for them. It requires only some one who knows his subject, who is interesting and who has a voice that will carry, to put it across.

There should be talks at schools, high schools and grade schools. I may have told some of you in the summer that I have talked in every high school in Cleveland, Akron, and Barbartown. Honey should be discussed at Kiwanis, Lions, Exchange, and other luncheon clubs. I have talked at nearly 50 clubs on honey, never once mentioning my honey. These clubs are very anxious for speakers to talk on food products. It is very much worth while. There are many who are eager for that information.

Here is something new. Banks, especially during Thrift Week, are anxious for something new. You can put a glass hive of bees in a bank window with a printed card telling about bees as bankers. Banks are glad for these exhibits and most of them will pay \$10 for having the colony of bees in the window during Thrift Week.

The deplorable fact is not so much that people are not eating enough honey and that the average consumption of cane sugar is 115 to 118 pounds per capita per year and only a little over two pounds of honey. The deplorable fact is that people are indifferent. They never think of it—they don't know it is there. It is not a part of their vocabulary or a part of their diet. We have the whole future ahead of us along that line.

Here is something else that I think can be done at a comparatively little expense. I brought along with me from Medina a little exhibit that has been loaned to us by the Field Museum. The Field Museum, through the N. W. Harris Extension School, has made eight splendid exhibits like this one, from material that we furnished from Medina; 500,000 school children in Cook County are going to write papers on these eight exhibits. We

can't start too young telling children about honey. It starts a little interest in honey, as has already been proven. The same can be done elsewhere, and I would like to see it done here in Milwaukee. It would be a splendid thing for the Wisconsin market.

This idea of passing honey on to big meetings: There are plenty of chances to do this. When you hear of a big meeting which 200 or 300 attend, tell them you would like to furnish the honey. Let the Association chip in on that. A lot of people that have never yet thought of honey will then surely think of it.

We, as beekeepers, have not done our part. And when I say beekeepers, I want to claim the honor of being a beekeeper. We have 22 bee yards that we are running on a commercial scale. I would much rather be considered a beekeeper than be classed with any other group in the whole wide world.

WEDDING BEE AND BLOSSOM IN 1200 ACRES OF APPLES (By G. H. Cale.)

The title is significant of the story. Bees and apples have been linked together by necessity long enough for acceptance, but there has never been an attempt on a larger scale to demonstrate how much bees will do for the commercial apple grower than the one I am about to relate.

I have seen apple trees cover acres of ground, but never before have I seen them sweep from view as they do on the McClay estate at Hillview, Illinois. Here, as far as vision carries, the world is apple trees, and to see the sea of bloom in spring is a red letter event. The beauty of the delicate flowers can never be more gorgeous, as they spread about, far into the distance.

The town of Hillview is just half way between Kansas City and Chicago, on the Chicago and Alton railroad. The soil is especially well adapted to fruit growing, as it is a deep, wind-blown loess, still loose for many feet down and still fairly sweet where it has not been too badly washed. The land is quite hilly, not easily farmed, and the slopes allow enough air drainage so that trees are not often injured by low temperature. Because of these natural advantages there are a number of large orchards in the region.

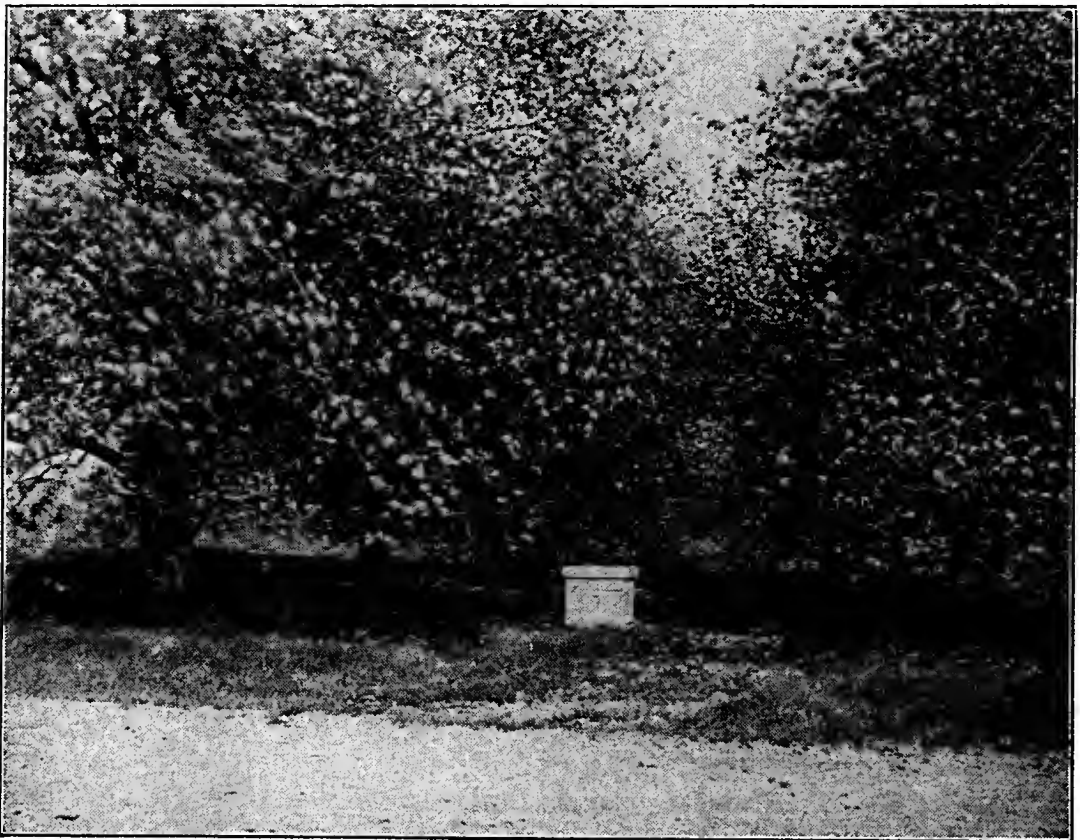


One of the oldest of the large commercial orchards belongs to the McClay estate. The father of the present McClay boys came from Vermont, in 1869, and in time established in Chicago a successful produce commission house. He bought apples in southern Illinois and married an apple grower's daughter, later buying the place at Hillview where, forty or fifty years ago he established the orchards which now bear his name.

The present orchards comprise the original plantings, still owned entirely by the estate, and a later block now owned by Albert McClay, who is the present manager of the entire place, in all about 1,200 acres, the largest acreage of apples in the world under one management in one place.

The orchards are in a commanding location, seeming to be on top of the world. From different vantage points one can look out over great distances, with avenues of trees extending in every direction. It does not look as though it would be hard to walk to any point among them and back, but it is not as easy as it looks. No novice will attempt it twice, as it takes a "barrel hound," as the old men well acquainted with the ground are called, to guide a newcomer around successfully.

The apples grown are mostly varieties which will keep well in storage, principally Willow Twigs, Black Twigs, Jonathans, Ben Davis, Missouri Pippins, Gano, some Maiden Blush and Grimes Golden and a few Winesaps.

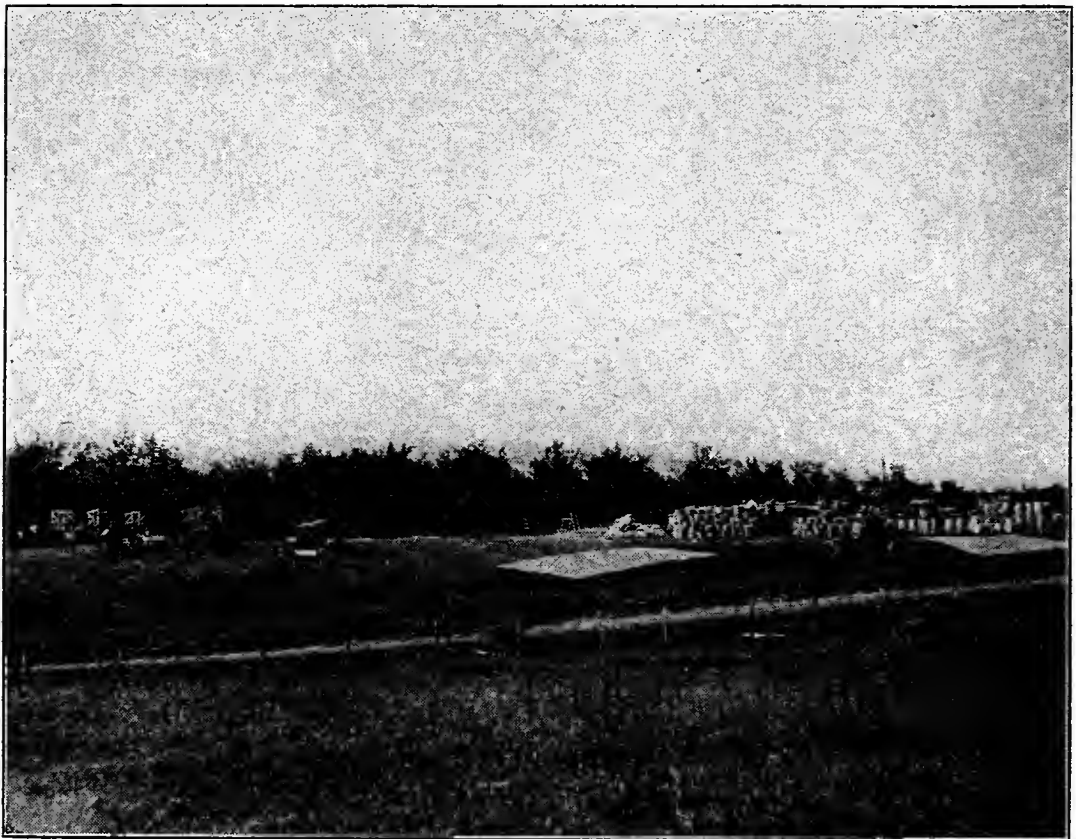


Albert McClay is a masterful man, used to heavy loads, and one who cannot be interested in small ventures. An establishment of the kind he manages is just to his liking and some idea of its immensity can be gained from the striking figures in the course of this story.

The amount of money invested in an enterprise of this sort is not apparent to the casual observer, but when the facts are known they rather stagger the imagination. The permanent physical equipment, buildings, stock, trees, machines, spraying outfits, ladders, mixing tanks, pipe lines, trucks, and all the odds and ends needed for the work, are valued at a sum which would be a comfortable fortune for most of us. The cost of planting trees, bringing them to bearing, and keeping them in condition from year to year is well into six figures. As Mr. Rice, one of the orchard foremen, put it, "When we have to spend money in this orchard we just shut our eyes and spend."

Besides the residences of the manager and his mother, two large, substantial homes, there are about thirty-eight houses on the estate where the regular employees live with their families. These homes are owned by the estate and rented at a nominal figure. Scattered about among the different orchard blocks, they serve partly as a protection to the crop.

The big boarding house, which you see in the picture, will accommodate a good share of the crew during the picking season.



The barns, barrel sheds, and packing house, added to those buildings already mentioned, would, if gathered together, make a fair-sized village.

Stretching through the orchards are fourteen miles of pipe lines, leading to the big mixing tanks, conveniently placed so the sprays may be mixed right among the trees. There are seventeen spray outfits, all of which are in use at some time during the spraying season.

International trucks haul materials back and forth from the orchards to the packing house and to the cars as they are loaded. The hilly nature of the land is such that cars cannot be used to advantage in the orchards themselves, so wagons are used for this purpose and mules are the most satisfactory motive power. There are fifty or more mules on the place all the time.

About eighty-five men are employed constantly. It is their job to work the orchards, pruning, fertilizing, cultivating, and generally caring for the place. It is probable that the annual overhead of an orchard of this size, whether or not an apple is picked, will come somewhere between \$150,000 and \$200,000.

Things are comparatively quiet at Hillview until the picking season. But when the fruit is ripe, how things change! Apple men come in from all directions—bosses, pickers, sorters, facers, tailers—all good men from north, south, east and west—until 250 or 300 of them are there. For two or three months the picking of fruit will be their task. Some of these men have been coming to the McClay orchards for years. Although there is naturally quite a fluctuation in the membership of the crew, most of them are veteran orchard men who know their work and know it well.

To watch a group of experienced apple pickers, perched about a tree, fills the novice with awe. Apples disappear like magic from limb to bag. Each picker has a number, and as he empties his bag on the sorting table, he calls his number, which the boss enters on a tally card. This keeps strict count.

When the men gather at the boarding house at night it is a unique sight. The cooks have supper ready and, at the call, the long lines of tables in the big dining room are filled with famished huskies. There is the best of food and plenty of it.

After the meal the boys gather for an evening of entertainment. There are games, music and impromptu amusements. They have the best of accommodations. The rooms are separate like those of a hotel, with every comfort provided, even to shower baths.

This is a fair picture of the setting for the most outstanding practical experiment in the value of bees as pollinators that has yet been tried. McClay has given every attention possible to the trees, leaving nothing undone that might increase their vigor or their yield. Two years ago Mr. W. P. Flint, the Illinois Extension Entomologist, from Urbana, suggested to him that the light set of fruit he had been getting in certain blocks might be due

to the lack of insect pollinators at the time the trees were in bloom. Flint suggested that bees might help.

The idea seemed logical to McClay, so he tramped the countryside, picking up colonies of bees, since that was to him the beginning and end of the problem. It was simply a job of buying bees in hives and setting them in the orchards. It soon became apparent, however, that to establish the bees was a man's sized job and that there was more to beekeeping than he had ever supposed.

The farther he went, the worse it got; in fact he soon admitted that it was entirely beyond him. But he was sold on the need for bees, as every worth-while experiment, that gave him published information, pointed out irresistibly that bees were a help in the commercial orchard, and, in the case of some fruits, were an absolute necessity. Since man has upset nature's balance in planting fruit in large blocks, he must establish it again by providing all the conditions needed for fruit setting, pollinators not excepted.

His next step was to hire a competent beekeeper, Mr. Kennedy, who came to him from Nebraska. Kennedy, a firm believer in clean bees, induced McClay to buy packages from the south, as he found that many of the hives McClay had so painstakingly gathered about the countryside had foulbrood.

Kennedy boomed right into the job, but many of the trees had been in bloom some time, when the last shipments of bees



came, so they were established rather late for best results the first year. Colonies were set among the trees so that each one had close access to a limited number. The plan followed was to have one hive at every twelfth tree in the row and the next lot six rows over, alternating the position of the hives so they were between those in the previous row. This management was a very important item, as important as any in the entire experiment, as it insured a maximum number of bees in a small area. The value of this became evident when the bees had only a few flying hours in the day. They stayed close to the hive and worked hard, while more extended foraging would have been difficult, and at times impossible.

It is not considered good practice in this orchard to spray with the bloom on, so no revision of schedule was needed on that score for the sake of the bees. When the bloom starts to drop, spraying begins, and since there are other varieties still in bloom, it was deemed best, to avoid all possibility of injury to the bees, to move them to the foot of the hills, some distance away, in reach of the river bottom land. This soil, as well as the loess on the hills, is quite sweet, making for a ready growth of clover, and large amounts of alsike are grown there.

With the alsike and the usual white clover and fall flowers, which are so common in the Illinois river bottoms, a good crop of honey would have ordinarily been assured. Theirs was the luck of the beginner as a late freeze in May caught all the clover and ruined the prospects from that source.



There is little in the orchard for the bees when the bloom is over, as practically no cultivation is carried on. McClay much prefers blue grass sod on these hills, as it insures better air drainage and better moisture conditions. With the bees out, the beekeeper can prepare them for a flow elsewhere. They are in the best of shape, coming from the apple bloom with an abundance of honey and pollen. After the season, the colonies are prepared for winter and in the spring moved back again to the orchards in time for the bloom.

The results the first season in the orchards cannot be taken conclusively in favor of the bees unless they are followed by similar results the next few years. But even so, they are striking and the older men, who have been in the orchard for years, admit that something has influenced the set of the fruit in a way they have never seen before, although not all of them are ready to admit that the bees are responsible for the difference.

From the early set, everyone was jubilant. The prospects were for 100,000 barrels of No. 1 apples, which would have been a phenomenal crop. A freeze on the 25th day of May destroyed many of the newly set fruits; later a hail storm left marks, and finally a series of hot, dry winds cooked many of the exposed apples so they rained down in heaps. Ten thousand barrels were estimated lost by this drop.

In spite of the reverses, however, the crop was remarkable. There were 65,000 barrels of No. 1 apples and 200 carloads of bulk apples. The previous best crop was 51,000 barrels, which gives an increase for 1925 of 14,000 barrels over the best crop. It was over twice the crop for 1924, while the yields in the two nearest commercial orchards were only about half what they were in 1924. If the bees are responsible for only a part of this increase they will surely be an investment in high finance.

The first bees were placed among the Ganos and Missouri Pippins. Since 1910 there had not been a paying crop of Ganos. The best crop in that interval was in 1923, when the yield was an average of $2\frac{1}{2}$ barrels to the tree. This year the yield was $5\frac{1}{2}$ barrels to the tree. The Pippins were loaded as never before.

The last bees were put in a small block of Winesaps. They are young trees and have set a noticeable amount of fruit but once before. Although the bloom had started to fall, the bees did some work, with the result that there was a scattering set of fruit all through the block, with one or two trees quite well set. If full colonies had been there in early bloom, with a heavy set of fruit resulting, it would have been the most convincing evidence in the entire experiment.

HOW BEES "MAKE" HONEY.

(By O. W. Park, Iowa Experiment Station.)

In early times it was thought that honey was a product of the flowers which was simply gathered and carried home by the bees, and that it was stored by them in the honey comb without change. For this reason, the scientific name first given to the honeybee was *Apis mellifera* which means the honey-carrying bee. Later it was discovered that there was a vast difference between honey and the original product obtained from the flowers by the bees, so the scientific name was changed to *Apis mellifica* which means the honey-making bee.

The sweet substance the bee sips from the clover blossom is properly known as nectar. While the chemical composition of nectars from different sources has been found to vary somewhat, in general we say that nectar is composed of about 80 percent water and 20 percent sugar which usually is in the form which is known to the chemist as cane sugar. Chemical analysis of honey has shown that on the average, honey—the finished product—is composed of about 20 percent water and 80 percent sugar. These are the same figures as for nectar except that they have traded positions. But other changes have occurred also. The cane sugar of the nectar has been acted upon by certain agents in the body of the bee which have split up the molecules of the cane sugar in such a way that the resulting products are known as dextrose and levulose. In addition, the bee has added a minute amount of some acid. It is often called formic acid although chemists have never determined just what kind of acid it really is.

Since, on a previous occasion (See Report for 1923, p. 41-46), I told you about the activities of field-bees in gathering the nectar, we will proceed at once to a discussion of the ways in which these remarkable changes are accomplished by the bee in the process of making honey out of nectar. But, don't expect too much along this line, for there is yet a great deal that has not been found out about the process.

In any field of knowledge in which only a part of the facts are known, a theory which takes into account practically all of the known facts in the case often proves very helpful in gaining other facts and, finally, in solving the problem. On the other hand many theories prove to be worthless, yet in the absence of facts, theories are to be encouraged, for there is nothing to lose but much to gain through the use of them. So I want to bring to your attention at this time a theory which was advanced

several years ago by Doctor Brunnich of Switzerland, in an attempt to uncover the facts concerning the method or methods employed by the bee for the elimination of water from the nectar. Some of you, no doubt, are familiar with this theory which may be referred to as the "excretion" theory.

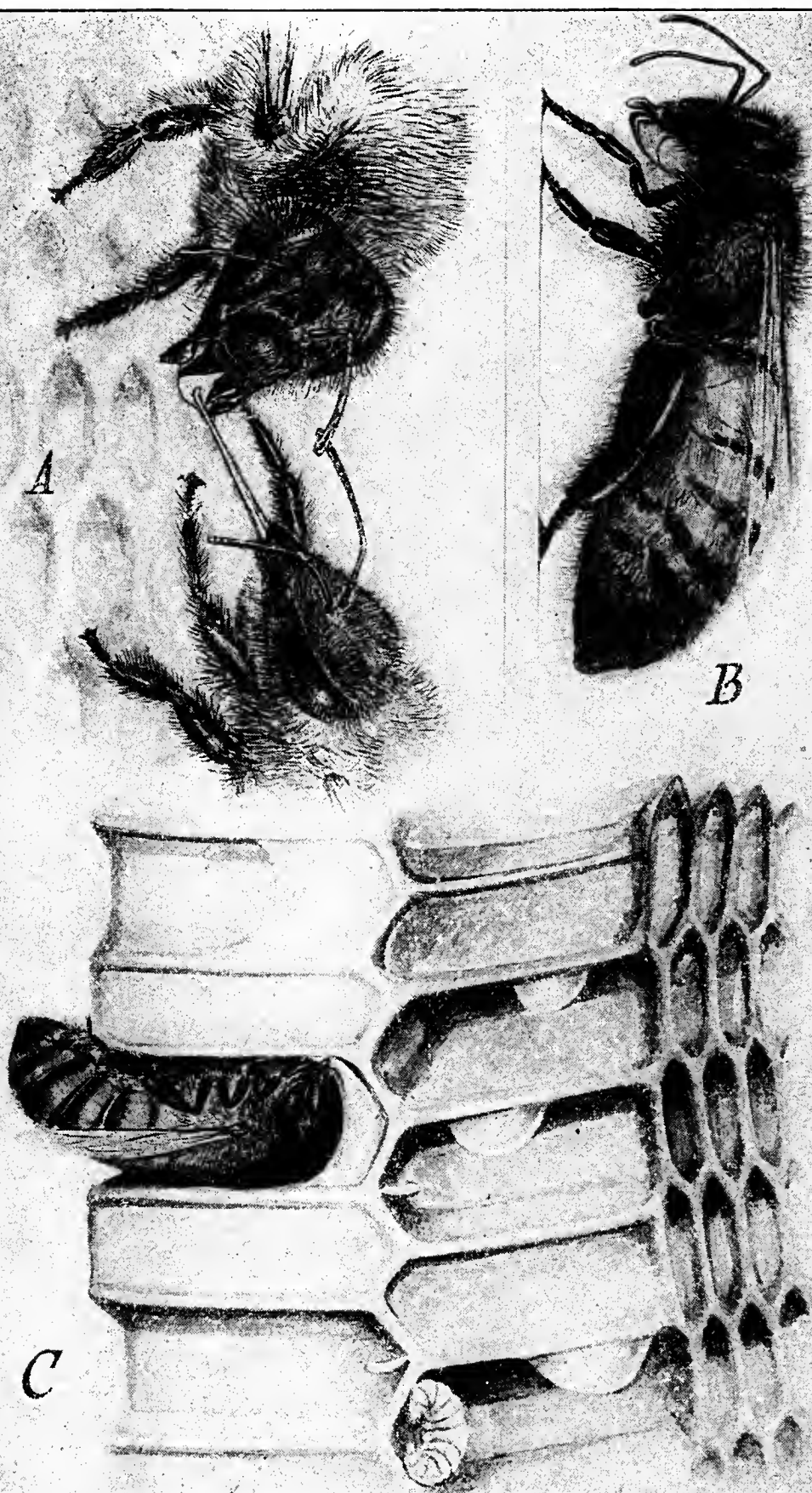
Briefly stated, Brunnich's "excretion" theory is that the honey-sac is a sort of semi-permeable membrane or filter through which a part of the water of the nectar passes into the blood from which it is removed by the so-called "rectal glands" which discharge it into the rectum.

In support of this theory, Brunnich cites the work of Huillon as well as experiments of his own. During a good honeyflow, Huillon took away all the combs from three colonies one evening and the following morning gave them empty combs. From colony 1, he removed these combs in the evening of the same day. From colony 2, the combs were removed the next morning. Colony 3 was placed in the cellar on the evening of the first day and was left there three days, after which the combs were removed. After being extracted, the specific gravity of the three samples thus obtained was found to be: 1.394, 1.415 and 1.432 for colonies 1, 2 and 3 respectively. These densities correspond respectively to 26, 22 and 17 percent water. Since ripe honey often contains as much as 20 percent water these results would indicate that the samples from colonies 2 and 3 were both practically ripe so far as water reduction was concerned, and that the sample from colony 1 had been reduced in water content to a much greater extent than could be accounted for by evaporation from the nectar while stored in the cells.

Brunnich showed by an experiment that a comb containing fresh honey left in a strong colony, but protected by wire-cloth so that no bee could reach it with its tongue, changed in density only from 1.288 to 1.340 during a period of eleven days of fine weather. Since it has been rather commonly observed that new honey normally ripens in about three days, we come to the conclusion that ordinary evaporation from the cells does not account for a very important part of the water reduction process.

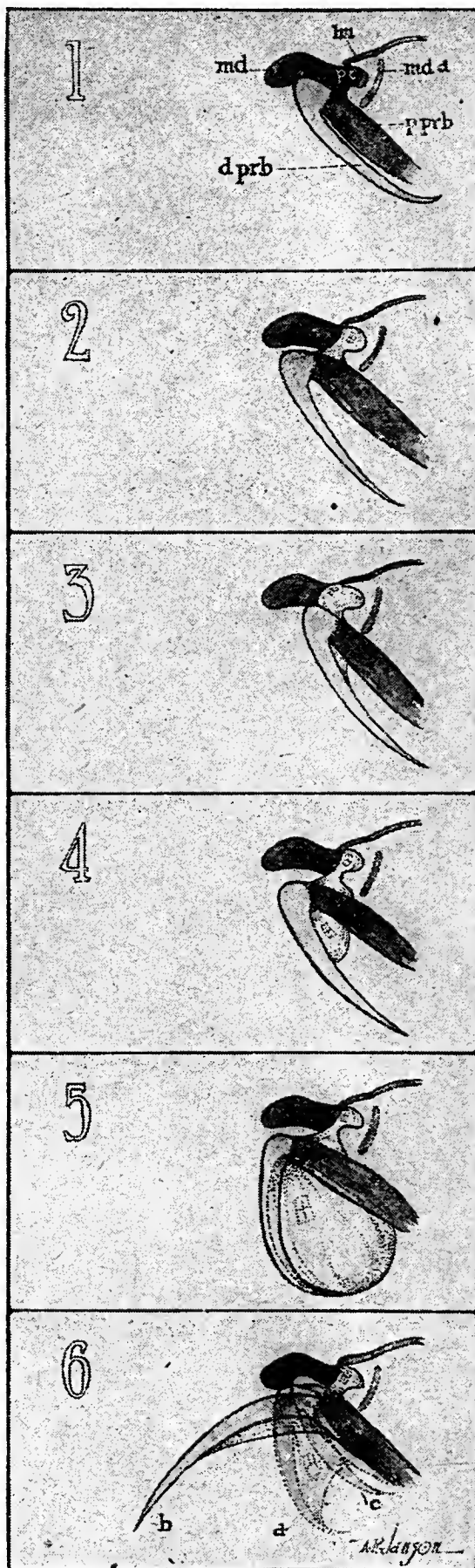
In this connection, the work of De Planta may be cited. He found that the sugar content of nectar from four different species of plants ranged from 7 to 40 percent, with an average of about 20 percent. While he made no determinations on nectar just as it arrived at the hive, he reported analysis of what he called "new honey" from five samples produced by three species of plants. The sugar content of these ranged between 66 and 79 percent. De Planta's own interpretation of these data was that he believed that the bees threw off a considerable quantity of the water while the nectar was in their honey-sacs.

In line with this theory, there is also the well known circumstantial evidence that, during a heavy honeyflow, incoming bees often spurt out a tiny jet of colorless liquid before entering the hive. A. I. Root, in 1874, while conducting an experiment on



Legends for Illustrations.

Figure 1. A. The transfer of nectar from field-bee (above) to house-bee (below). B. House-bee ripening nectar. C. House-bee depositing honey.
Figure 2. Diagrammatic sketches of mouth-parts of a bee ripening honey. lm, labrum or upper lip. pc, preoral cavity or mouth. md, right mandible or jaw. md a, place of attachment for left mandible. p. prb, proximal portion of the proboscis. d. prb, distal portion of proboscis.



wintering bees in a greenhouse, made an observation which is of interest in this connection. The bees had been in the greenhouse three days and were feeding on *thin* syrup from a feeder located at the opposite end of the room, when he noticed laden bees going out of a hive so rapidly that he suspected the colony was being robbed. But he succeeded in following them on the wing and made out to his entire satisfaction that after flying a while in the sunshine, they discharged from their bodies what seemed to be only pure water. After this maneuver, they were seen to return immediately to their hive with bodies so reduced in size that they made quite a contrast with their comrades who were just going out. Root suggested that this might be a part of the natural process of freeing the raw honey of its superfluous water.

Thompson, in 1880, reported similar observations on bees fed very thin syrup either inside the hive or in the open air. He also collected on a sheet of oil-cloth, enough of the spray to get a taste of it. He found no sweetness about it and, so far as he could tell, it was pure water. He concluded that the honey-sac must be a sort of laboratory or filter.

Other observations on the tiny jet of colorless liquid ejected by bees working on thin syrup or nectar are so numerous that only a few of the more important ones can be mentioned in this brief discussion. E. R. Root relates that his father once collected the spray from bees working on the spider plant, by catching it on dinner plates and after tasting it, decided it was nothing but water. He found also that upon evaporating, no deposit was left on the plates. For comparison, he collected nectar direct from the plants and found it decidedly sweet.

It has been shown that the excretion theory is supported by considerable evidence and, so far as the writer is aware, there is only one little bit of evidence against it, and that is the fact that bees carrying only water have been reported, in a few cases, to eject colorless liquid in a manner similar to those carrying thin syrup or nectar. This may possibly be accounted for by the fact that most field-bees have been found to carry a small quantity of honey in their honey-sacs when leaving the hive. If water be added to this, the result is a dilute sugar solution, which is exactly what is obtained by bees when they feed on thin syrup or nectar. It should be remembered, however, that in spite of the fact that the "excretion" theory fits in nicely with most of the known facts, it is as yet only a theory.

Ripening Done by House-Bees.

We are not, however, dependent upon theory alone for an explanation of how a considerable portion of the moisture is eliminated from nectar. Observations by the writer and others have shown that the house-bees greatly facilitate the evaporation process. You will recall that when a field-bee comes in with a load of nectar, as a rule, she does not deposit her load in a cell but passes it over to the house-bees, usually distributing it among

three or four of them. The manner in which the transfer is made is shown at A in Figure 1, in which the field-bee (upper), with her tongue folded back under her chin, is forcing the nectar to flow out over the upper surface of her tongue, while the house-bee (lower), with outstretched tongue, transfers the nectar to her own honey-sac.

When the house-bee has received her portion of the field-bee's load, she meanders about the hive in search of a place where she will not be crowded. Here she usually takes up the characteristic position shown at B in Figure 1, having the long axis of her body in a perpendicular position with head uppermost. She at once begins to go through a series of operations which are illustrated diagrammatically in Figure 2.

Starting with the mouth parts at rest as shown in the first diagram, the jaws are opened wide and the whole proboscis is moved somewhat forward and downward. At the same time, the distal portion of the proboscis (d prb) is swung outward a little, and a small droplet of nectar appears in the preoral cavity (pc) as shown in the second diagram. The whole proboscis is then raised and retracted almost to the position of rest, but is depressed again and is again raised as before, and so on. With each succeeding depression, the distal portion of the proboscis swings outward a little farther than before, but it makes only the beginning of a return to its position of rest.

Accompanying the second depression of the proboscis, an increased amount of nectar appears in the preoral cavity, some of which begins to flow out over the upper surface of the proboscis. As the proboscis is raised and retracted the second time, the beginning of a drop of nectar may usually be seen in the angle formed by its two major portions as shown in the third diagram. This droplet increases in size each time the proboscis is alternately depressed and raised until a maximum droplet is produced as illustrated by the fifth diagram. The bee then draws the entire drop inside its body. As the nectar begins to be drawn in, the drop assumes a concave surface at its lower end, as shown at a in the sixth diagram. The distal portion of the proboscis is extended as at b until the drop has disappeared, when it is again folded back to the position of rest indicated at c.

A bee commonly spends from five to ten seconds in carrying out the series of activities illustrated in Figure 2. This procedure is repeated with only brief pauses for about twenty minutes, although both of these intervals are subject to considerable variation. Upon the completion of this part of the ripening process, the bee searches out a cell in which to deposit the drop she has been concentrating. Into this cell she crawls, with her back downward as shown in Figure 1, C. This position is characteristic of a bee depositing honey. If the cell is empty, she enters until her mouth-parts touch the upper rear angle of the cell. The honey is forced out over the dorsal surface of the folded proboscis between the mandibles or jaws which are held well

apart. Then, using the mouth-parts as a brush, and turning her head from side to side, she "paints" the nectar across the upper wall of the cell so that it runs down and occupies the rear portion of the cell. But if the cell already contains honey, she dips her mouth-parts into the honey already there and adds her drop directly and without the "painting" process. Whether the nectar is ordinarily put through this process more than once before it is fully ripened was not definitely determined, but it seems probable that it may be worked over several times.

It appears that the procedure described above has for one of its principal objects, the evaporation of water from the nectar. This is effectively accomplished by exposing the nectar in a thin film as it flows out over the proboscis. The drop which forms in the angle of the proboscis also exposes a relatively large surface for evaporation, and a noticeable reduction in the size of this drop is readily observed, as the drop is worked and reworked repeatedly. It seems probable, therefore, that this activity of the house-bees is responsible to a large extent for the concentration of the nectar.

The bees also make use of another means for hastening evaporation. When nectar is coming in rapidly, and particularly if it is very thin, the house-bee often does not stop to put it through the ripening process, but deposits it almost at once; and instead of depositing the entire load in a single cell, she usually distributes it among three or four cells by attaching a small hanging drop to the roof of each, as is shown in Figure 1, C. The hanging drop exposes a maximum surface for evaporation; and these droplets are "hung up to dry," either in empty cells or in cells that contain eggs or young larvae. Later these droplets are collected, and it is assumed that they are then put through the ripening process already described. Thus we see how necessary it is to provide a colony with more supers during the honeyflow than will be required to hold the finished product.

It was formerly assumed that all of the excess water of nectar was evaporated from the cells after it had been deposited, but Brunnich has given data to show that it is a physical impossibility for evaporation to take place fast enough from nectar in the cells, to account for such rapid reduction in water content as has been found to occur. Furthermore, it is impossible to say whether the activities of the house-bees described above would altogether account for this rapid reduction. If it should be proven that the field-bee does have a means for separating out a part of the water while carrying the nectar home, it would seem probable that a similar process would also take place while the nectar is in the honey-sac of the house-bee. Should this prove to be the case, the rapid reduction of the water content of nectar would be amply accounted for.

Comparatively little is known about how the bee changes the chemical nature of the sugar content of nectar. There seems to be no doubt but that the inversion process is brought about

by a substance called invertase, but what its source may be, and how and when it is added to the nectar are still unknown. If the invertase is a product of some of the so-called salivary glands or other glands which have their outlets among the mouth-parts, the process described above, in which the nectar is repeatedly forced out over the tongue and drawn back in, would provide ample opportunity for the addition of such a substance. It is known, however, that the inversion process is not completed when the new honey is first deposited in the cells, but that the process continues for a time after it has been stored.

Reference has been made to the minute quantity of acid which is always present in honey. Nothing whatever is known about the source of this acid. Some of the early writers accounted for its presence by saying that just before each cell was to be finally sealed up, a bee would inject a small drop of acid with her sting to keep the honey from spoiling, but careful observations by more recent investigators have failed to reveal any such procedure on the part of the bee.

It is commonly said and generally true that the bees do not seal up the cells until the honey is entirely ripe. Since unripe honey is apt to spoil, it usually does not pay to remove it from the hive until it has been sealed. Furthermore, honey which has been left with the bees for several weeks after being sealed, seems to take on a certain richness and a superior quality which are difficult either to account for or to describe.

The honeybee's "patent rights" on her secret process of honey-making have not yet "run out"; and, until they do, we shall have to get along with what little knowledge we have on the subject together with what we may be able to find out by patient observation and research.

FRUIT GROWING AND BEEKEEPING NORTH AND SOUTH.

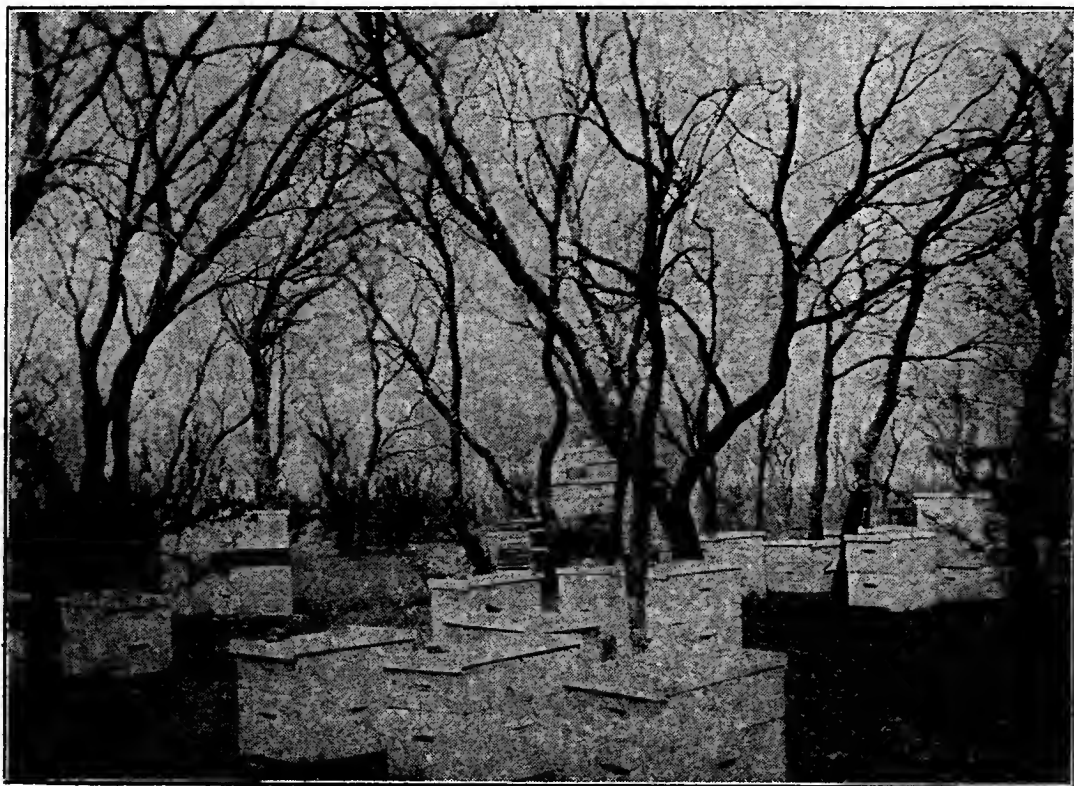
(By Frank C. Pellett, Hamilton, Illinois. Author "*Productive Beekeeping*," "*American Honey Plants*," etc.)

It is natural for those of us who have always lived in the North to dream of a home where the winter skies are always balmy and where it is unnecessary to shovel coal and battle with snow drifts. Someway we feel that winter in the South should be like a continuation of our summers here. In our dream picture there are orchards of the finest fruit and the bees are humming away merrily piling up the honey throughout the year. I, at least, must confess to once having had some such dream. Accordingly in the spring of 1902 I took a bride and an abbreviated bank balance and went south to "The land of the big red apple" which I had heard so much about. Alas, how often the reality differs substantially from the dream. I bought a fine orchard of forty-five acres of bearing apples of well chosen varieties and prepared to enjoy the life of a fruit grower. The year 1902 was one of the few big apple crop years in the Ozark region. Did I



not see the orchard with its loads of fruit and did it not show for itself what it would do? Unfortunately for me it seemed unable to repeat the performance.

Climatic conditions in the Ozarks are such as to make outdoor living very attractive, but the soil is poor and requires much feeding to produce properly. This could be done though somewhat expensive, but the fruit grower finds a much more difficult problem in the spring frosts. The winters are mild and the fruit trees blossom very early with the result that they usually get frozen. With the exception of pasture for the team and a cow, the balance of my farm was in timber and there was no room for other crops. However, there seemed to be no occasion to need other crops, for I could figure a comfortable income from forty-five acres of orchard. For me the trees bloomed wonderfully and I will never forget the sight of that wide expanse of pink blossoms. One is dull indeed who is unmoved by the sight of a big orchard in bloom. Fortunately I enjoyed the blossoms to the full for they were all the crop secured. In May, long after the petals had fallen and when the little apples were nearly as big as the end of my finger there came a freeze. The young shoots on the oak trees were cut back from ten to fifteen inches and the woodlands looked as though swept by a fire. Except for one row of Whitney crabapples on a high point there was hardly an apple left in all that orchard and the total sales were less than \$100.00. It is needless to say that we did not live on a very elaborate scale that season.



Although the frosts were not as severe every year, spring frosts cut back the fruit crop to some extent every one of the five years we lived there and it is my understanding that there has never been a full crop of apples harvested in that orchard since 1902.

Since that time I have had the pleasure of visiting every southern state, except the Carolinas, from Virginia to California and have looked in vain for the country of my dreams. There are a few small areas in California and extreme southern Florida where frost is not a menace. Generally speaking, however, frost is the bane of the fruit grower's life in all America, and the farther south one goes the more serious it becomes. Here in Illinois we have an occasional crop cut short by spring frost and it is only as we go northward that the fruit grower is fairly safe from its visitation.

If one wants to see really fine orchards he should look in the North, rather than in the South. Western New York, the Grimsby region in Ontario, northern Michigan and northeastern Wisconsin are all regions where fruit growing has been developed to a high degree.

Compensations.

Nature has a way of giving freely in one direction and withholding in another. To Florida she has given a pleasant climate and ample rainfall, but the soil is so poor as to make one weep. The toll for fertilizer is so high as to be unprofitable for ordinary crops and it is only special lines which are in demand at high prices, that are likely to reward the grower.

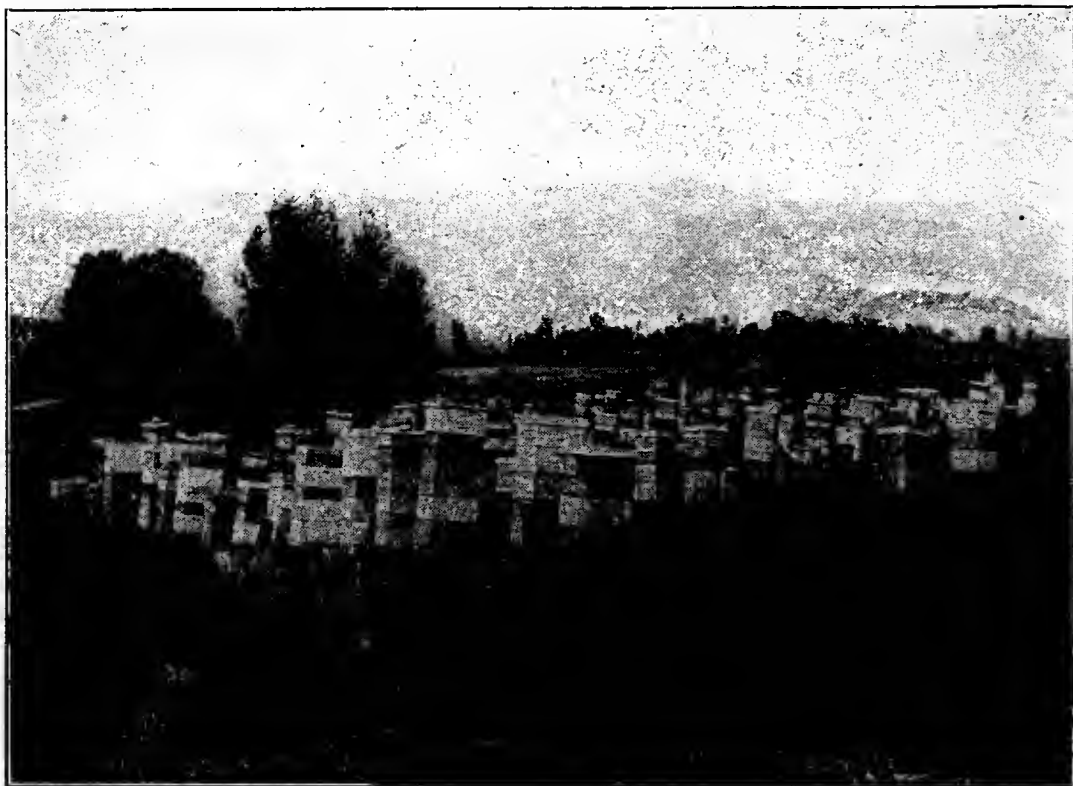


An entirely satisfactory explanation has never been offered to me for the almost entire absence of fruit throughout most of the southern states. A few figs and peaches are about all the fruit that one sees from Georgia to Texas. I feel sure that a much greater variety could be grown if sufficient effort was put forth. It is possible to raise a much greater variety of fruits in Iowa and similar regions than in any southern state. At least there is a far greater variety grown.

After one leaves the belt where apples are grown which terminates in Tennessee and Arkansas, one finds but little fruit until he reaches the citrus belt in Florida and extreme south Texas. Even there the variety offered seems small compared to this section. A few years ago the Texas Gulf Coast region was boomed for fig culture. Many settlers were attracted by the stories of profits from figs. Orchards were set and plans were laid for preserving the fruit. On a recent visit to Texas I was told that the scheme proved to be a gigantic failure.

If one would grow cotton, or peanuts or sugar cane he should go south with a reasonable prospect of success. If he would grow fruit let him stay here or go farther north.

Nature has been very generous with Illinois and Iowa—a rich soil, ample rainfall and not too extreme climate. Here in this intermediate region one finds the opportunity to grow the greatest possible variety of plants adapted to a wide range of conditions.



Fruit growing has become an important industry in the valleys of California but our problems are small compared to theirs. Water must be provided by means of expensive irrigation systems and carried for long distances from melting snows in the mountains; frost is a constant menace in many locations and they are dependent upon distant markets which can only be reached at the end of long hauls. When, as sometimes happens, freight cars are not available at the proper time much of the fruit rots in the orchards. Labor problems are bad enough in the middle west but they are not to be compared to California where migratory workers are largely depended upon.

As far as insect pests and fungus diseases are concerned there seems to be enough to go round and fruit growers in one locality will find something to balance the bugs offered by another.

The Beekeepers Problems.

There seems to be an almost universal notion among those who have not investigated, that beekeeping in the South must be a bonanza. It is a popular notion that the bees can work all the year around and because of the mild weather there will be no winter problem to contend with. The facts are that with beekeeping, like fruit growing, the farther north one goes, within reasonable limits, the more profitable the business becomes.

There is a very serious winter problem in the South. Unlike the wintering problem of the North it becomes one of conserving bees and stores. There are long periods of warm weather when there is nothing for the bees to gather in the field. The bees are worn out with constant searching and brood rearing is continued with the result that large quantities of honey are consumed in rearing bees which are unable to add to the productive store of the colony. It is the southern beekeepers problem to avoid converting all the honey into bees which will be of no use to him. To paraphrase the old corn story, they raise more bees to gather more honey to raise more bees and so on forever, with little honey left for the beekeeper. In a famous beekeeping section of west Texas I found beekeepers with hundreds of colonies who reported not to exceed an average of 25 pounds of surplus honey per hive for a ten year average. In contrast to that, near Winnipeg, Canada, I found beekeepers who report 150 pounds for a ten year average.

In the North, when the harvest is over, the bees discontinue brood rearing and are inactive until the following spring. They consume a minimum of stores since all they need is enough to provide sufficient heat for the colony. The beekeeper has only to provide proper conditions to carry them through the winter with a minimum of loss.

In the South when the season is over there begins a long period when robbing is a constant terror to the beekeeper. Beekeepers of my acquaintance in Louisiana sometimes find it

necessary to plaster up every crevice in the hives with mud, leaving only a very small entrance. The care of the surplus extracting combs becomes a serious problem also. Because of the mild weather the waxworms work throughout the year and combs not left in the care of strong colonies will be destroyed by the worms within a short time.

In the South there is a much larger variety of flowers which yield honey in surplus quantity and the honey from different sources is so mixed that it is difficult to keep the high quality honey separated. The result is that the product brings a lower price in the big city markets than does the clover and alfalfa honey produced by northern beemen. There are several southern plants like the bitterweed and the chinquapin which yield honey of such poor quality that it is not fit to be used for food and can only be fed back to the bees. In localities where these plants are common it is very important to remove all good honey from the hive as soon as they begin to bloom to avoid spoiling the whole crop by the mixture. A very small quantity of bitterweed honey will spoil a barrel of good honey.

There are numerous locations in the South where there is a serious shortage of pollen at certain seasons of the year. Without a pollen supply the bees cannot continue brood rearing and it often happens that this dearth comes just when it is most needed to enable the bees to build up in advance of the principal honey flows. There are few northern locations where such a problem is to be met.

Since the northern beekeeper produces a larger average crop of honey of better quality and which brings a higher price, his situation is much better for honey production. On the other hand the southern beekeeper is far better situated for queen breeding and the production of live bees. The development of the package trade in live bees has opened a market for large establishments which sell bees and queens to northern buyers. For queen breeding go south but for honey production stay in Illinois or go north.

The more I see of the South the more I am convinced that the fruit grower or beekeeper will do well to produce his fruit and honey in the North and spend his winter vacation in the South, unmindful of the problems of production under its less favorable conditions. If he can make his money in the pleasant season in the North and spend it under balmy winter skies in the South, he can get the most satisfaction from both the making and the spending.

On the whole, the more I know of other regions the better I like Illinois.

FIELD NOTES ON HONEY FROM LONG-TUBED FLOWERS.

(By A. C. Burrill, Curator, Missouri Resources Museum.)

Reason for Discussion.—This topic restates a question common in American bee journals and has not yet reached the dignity of a thesis. It is a challenge to get more field research rather than a solution of a dispute. Frequent, conflicting observations on honey bees as visitors on flora like red clover which they are not supposed to visit for nectar on the theory that their tongues are too short, (Graenicher, 1910; Folsom, 1909, page 116), is warrant enough for this statement. The further tenet that honey bees cannot use their jaws to bite into fruits and flowers as do some Aculeate Hymenoptera seems to be justified (cf. E. R. Root, 1911 (1908) page 1) but may be affected by further observations.

Literature on Bees at Perforated Fruits and Flowers.—The latter tenet, viz.: that honey bees cannot bite fruits or flowers has been well attested by Dr. Garman (1904) that snowy tree crickets and other insects make the abrasions in grapes, pears and other fruits, often by night, and the honey bee then feeds at the punctures by day and gets the blame for the holes or perforations they are found visiting. That the honey bee follows other insects seems to be increasingly common in the scarce literature, covering this topic on "Honey Bees and Perforated Flowers," as quoted by Robertson (1925). This aptitude to find ways to sweets through perforations by other insects may be considered a natural extension of the social instinct by which bees of the same or different hives search out stores of sweets indicated by other insects.

Examples from Literature.—Just as honey bees follow into holes in pears and grapes and the like, where holes were made by grass culms as fruits fall, by tree crickets, ground beetles, wasps, or ants, so honey bees seem to visit spots where they can get sweet sap from pruned, worm-bored, or other effect causing bleeding of box elders (*Acer negundo*), sugar maples (*A. saccharum*), etc., in early spring or at times when good nectar supply is scarce. Robertson quotes Sprengel (1793) and Mueller (1873) on honey bees seen making holes in the flowers of garden columbine (*Aquilegia vulgaris*), and Mueller again on perforating flowers of the European heath (*Erica tetralix*), and the Ground Ivy or Jill-run-over-the-ground (*Nepeta glechoma*). These are European observers and although the plants in question are grown in America, the observations do not seem to have been repeated in this country. Every summer in my youth I saw

bees at the European ground ivy (*N. glechoma*) without noting perforations, at North Brookfield, Massachusetts. Dr. Pammel of Iowa (1883) has seen them at red clover (*Trifolium pratense*) but C. P. Dadant (American Bee Journal, March, 1923, page 119) denies bees make any holes and some teachers of bee habits agree with this view. Pammel measured red clovers stunted by dry growing seasons and could find no results shortening tubes, so bees could reach the nectar. Pammel, Knuth (1906-8) and others agree that the honey bee proboscis is too short to reach nectar.

Often Get Honey Dew for Nectar.—My first field observations were in the great clover aphid (*A. bakeri*) epidemic in South Idaho in 1916, when I was taken to a large red clover field near Nampa, Idaho, on the edge of the desert or non-irrigated lands, which nearly surrounded this particular field. The bees were here and not in the lava plain flora surrounding. Crystallizing honey-dew was on almost every blossom before the middle of August, and so much honey-dew was stored in the combs of leading apiaries (as E. F. Atwater, Meridian, Id.) in that vicinity, a wine-red nectar, making a red-tinted honey, that few questions were asked as to other sources of sweets, when thousands of bees were working the clover field. It maybe honey-dew caused the red color in the following records on red clover: Red-tinted honey was shown by C. H. True, Edgewood, Iowa, at the State Fair one year per Pellett in his excellent review (July, 1918; ib. 1923, American Honey Plants: 289-293) and thin watery red honey has been seen by T. Rehorst of Fond du Lac, Wisconsin, while honey-dew from red clover leaves (only case in literature, Pellett, ib.) is reported in the American Bee Journal, 1903, page 491.

Clover Aphid Fauna & Perforated Flowers; Honey-dew vs. Sap Leaks.—Due to the fact that the Idaho epidemic occurred in a dry heat when nectar flow was wanting generally, bees were forced to seek honey-dew sources to survive the summer drought. The epidemic brought its train of lady beetles, western flower bug (*Triphleps tricolor* White) and other insects, including a few undetermined Miridae (Burrill, 1918, pp. 421-2). Besides preying upon the aphid, some of these insects puncture the clover florets toward the base and must feed upon the nectar or plant juices there. The flower bug usually finds its aphid more common in the green leaf sheath bases or bracts of the leaves that subtend the flower heads, but the young nymphs wander through the fine spaces between the florets as in a miniature cane-break in the pursuit of young aphid instars. Some of these punctures exude sap, when the growing parts are turgid with sap. In infested clover fields, one finds an occasional morning when dew, despite the aridity, due to irrigation, is on the clover blooms, usually on the tops of the flower heads. Also there are globules of honey-dew under the clover head and in bad infestations, all through between florets (ib. p. 421). Besides, crystallizing globules are on the sides of florets close down to the calyx which I took to

be honey-dew but now believe were drops of nectar oozing from punctures. Honey bees sipped at these lower globules when "passing up" or neglecting the more hardened crystallized honey-dew.

Bees Get Red Clover Nectar Also; Bumble and Wood Bees Help.—These sources of supply were not given much thought until the American Bee Journal and others (Pellett, *ibid*, July, 1918, 238-9; October, 1918, 347-8) took up discussion of why honey bees visited red clover. It was stated that in case of drought or epidemic, red clover florets are foreshortened in the second crop and bee tongues can reach to nectar in these shorter florets at least on the outer circles, (Folsom, 1909, p. 116; Phillips, 1915, p. 395; Dadant, 1922, p. 96; Phillips and Demuth, 1922, p. 9; Dietz, 1925, p. 15); Pammel and Knuth (*ib.* Vol. 2, p. 289) to the contrary notwithstanding. This opinion is general, I believe: Pellett (*ib.* 1918) and Dietz (*ib.*) quoting many beekeepers on honey bees getting hundreds of pounds of nectar from red clover; and Phillips and Demuth (*ib.*, p. 9) claiming it an important minor source of nectar. Now there are other ways of securing nectar and sweets that need more study than has been given bee habits. Knuth (*ib.*) says the English bumblebee pierces the tubes of clover flowers (Root, 1917, pp. 16-8, says bites holes in) and that honey bees later follow through these slits to obtain nectar; Schneck says (1891) our carpenter or wood bee (*X. virginica*) slits the lower end of red clover corolla tubes, followed by honey bees getting nectar there. Dadant (1922, p. 96) says some bees tear corollas to reach nectar, but it is too rare to be of practical value. Schneck adds that honey bees visit wood bee slits low on corolla tubes of *Pentstemon pubescens*, *P. laevigatus*, *Pontederia cordata* and *Astragalus canadensis*. He says (*ib.*, p. 314) that Baltimore Orioles slit trumpet-flowers (*Tecoma radicans*) likewise to reach the nectar but cites no bee visits to slits.

Bees and Sap Leaks on Alfalfa and Norway Spruce.—Following my 1916 observation in Idaho, I found in 1917 something going wrong with seed production of alfalfa towards Buhl, South Central Idaho. A Mirid whose work was sent to the Bureau of Entomology or Plant Industry without recognition and identification, punctured through forming seed pods into the seed, resulting either in a bacterial rot or wilting to a flat thin pellicle of what was left of the forming seed inside. A depression also occurred outside of the pod, indicating where seed failed to form, and on it, an exudate which dried down black gradually to form another kind of a pellicle on the exterior. This injury differs from clover-seed chalcis work, because that insect does not, to my observation, cause a failure of the usual formation of seed coats. Now, in the fifteen minutes allowed me to observe this matter, an occasional honey bee came to the exudate where it was still fresh. Was it sweet? In the case of sapsucker injury to bark of Norway spruces in spring, we know the exudate or sap was sweet and visited by honey bees, bluff of Milwaukee

River, north Milwaukee, Wisconsin. I have waited eight years to repeat the alfalfa observation without success, and in studying at Logan, Utah, this summer, hoped to see this epidemic on alfalfa again. Though assigned to an alfalfa field in which I spent many hours each day, this Mirid and injury failed to come to my attention, so I am passing on the observation as a suggestion for any one who may be lucky enough to follow it up.

Wood Bees Aid Honeybees to Bush Honeysuckle Nectar.—Three years of desultory observations on the habits of wood bees (*Xylocopa virginica*) about bush honeysuckles, old porches, in grass, and other places, show that wood bees fly at temperatures in cold, late springs enduring about ten degrees more cold than field honey bees also flying for honeysuckle nectar. Thus honeybees failed to visit as often or on as many days, nectar sources such as perforated flowers, which soon wilt. Both wood and honey bees fail to reach to nectar in the long tubes of the bush honey-suckle (*Diervilla florida*) but the larger specimens of bumblebee (*Bremidae*) can reach the nectar. Mr. Ernst Schwarz, Preparator of the Missouri State Museum, urged me out to check up his wood bee observations and we found that the wood bees slit each honeysuckle tube in a longitudinal direction once or twice, usually close to the calyx tube or just within or under its sepal tips, and that honey bees go to the same slits for a means of ingress for their own mouth parts. Hundreds of flowers were so cut and directly visited by hive bees. This may not have been put in print before, but its evident importance to the question of honey bees getting nectar from long-tubed flowers was noted in Science anent the long discussion as to whether honey bees do or don't get nectar out of clover florets with tubes longer than the reach of honey bee mouth parts. Honey bees are very essential to get large seed crops from red clover according to L. C. Aicher (1917, p. 1) and Westgate, Coe, Pammel et al (1915, p. 19) seem to say honey bees set more seed in Iowa than bumblebees and Phillips and Demuth (1922, p. 9) agree, claiming much of our American clover honey contains red clover nectar. Pellett concludes in 1918, "Whether the corollas are punctured by other insects, the tubes are shortened by drought or the nectar rises higher in the tube, remains to be proven," but in 1925 (ib., p. 590, Dec. no.) reports them seen at perforations of other insects in red clover corollas, (also Robertson, 1925); and in his book, "American Honey Plants," (1923) found them getting at Buffalo currant (*Ribes aureum*) nectar where unknown agencies had slit the corolla tube entirely down one side. Robertson (1925, pp. 287-8) reports three more species of American flowers from which hive bees get nectar through perforations made by wasps (*Odynerus* or *Leionotus*).

Ants Cut Stamens to Reach Fruit-Tree Nectar and May Perforate Red Clover Bloom.—In closing, I would like to record that ants have trouble in getting by stamen bars of apple and prune blossoms to the nectar cup, where bees and other flying

creatures fly over the tops and in to reach nectar. I have found that *Formica integra* Nyl., a form of *F. truncicola* common to the Rockies and Inland Basin, gets around the difficulty by gnawing down one to three or four stamen bars while fresh and turgid, and thus gain access to nectar cup. Honey bees also use this entrance and exit on occasion. It seems from bagging such blossoms that apples develop but that single sepals may migrate to varying distances up to half way around or down the cheek of the apple before maturity. Some anatomists among the botanists might like to follow this lead. It will probably be found that common black ants (*Formica fusca subsericea*) have similar habits; and by night, carpenter ants (*Camponotus h. pennsylvanicus*), and mound-builders (*F. exsectoides*). On Idaho red clover, *F. integra* and *F. fusca* tend clover aphids, and also a tiny yellow ant. May these ants also gnaw holes in red clover corolla tubes?

Wild Bees Replace Bumblebee Work on Red Clover in West.

—There is some doubt whether the larger bumblebees ever split down mammoth red clover corolla tubes as do carpenter bees previously noted, and it is still more doubtful whether bumblebees are of any importance to clover in irrigated districts due to their scarcity in some years. If bumblebee scarcity should prove general, there is an abundance of other native bees to take their place at least in South Idaho. I refer especially to the so-called "sweat bees" called to my attention by Dr. J. M. Aldrich of the National Museum, of the genus *Halictus* whose colonies are often enormous, even in the edge of populous towns like Twin Falls, Idaho. A colony, almost half an acre in extent averaging at least one hole to the square yard in the railroad yards at Twin Falls, represented thousands of individuals. A similar colony was seen three miles away in the Snake River bottom on the Blue Lakes Ranch. They have been noted most extensively in L. C. Aicher's Bulletin 101 of the Idaho Agricultural Experiment Station together with the leaf cutting bees of the genus *Megachile*. Does their work aid honey bees to gether nectar in red clover?

Lady Beetles and Other Insects Perforate or Cut Clover Tubes Short.—Some lady beetles undoubtedly bite corolla tubes of red clover on occasion but whether honey bees get any advantage from their work, is not proved. There is much more to learn about the activities of the very common *Hippodamia convergens*. Its habits are quite varied with regard to feeding. Under my observation in daylight it sometimes fails to eat clover aphids but will sip at their honey-dew droplets. By enclosure in a tin capsule box or under cover of darkness, it suddenly goes into a wild frenzy of killing like a civit cat in a poultry yard and may destroy more than one hundred aphids in a few minutes, being entirely unable to consume its large kill. When there is no honey-dew about, it appears to try to perforate red clover corolla tubes in Idaho. I do not know if such habits have been recorded to

eastward. There are many other insects whose habits in this connection may benefit honey bee (Folsom, 1909, p. 116, notes that grasshoppers, beetles, and caterpillars cut red clover tubes short).

Do Honeybees Do Any Perforating in U. S.?—There is opportunity for every one to discover whether the honey bee can make its own holes in corolla tubes of red clover as reported for Europe. E. R. Root (1917, pp. 166-8; Dadant, 1922, p. 304) advocates raising longer-tongued honeybees, and in Europe is a call for red clover with shorter corolla tubes (Jour. Ec. Ent. 18, 6; 574, par. 5, "Apicultural Notes," 1925; also Dietz, 1925).

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APPENDIX.

When this paper was given at the Kansas City meeting, Dr. Pammel's paper had not been located. Suggestions given me at that time led to a more prolonged hunt for earlier writings, and while not yet complete, led to more discoveries.

Two of these papers were not in the State Library nor at the large University of Missouri Library. Rather than bother the Illinois and Shaw Garden Libraries, I wrote for the books to the Congressional Library and copied out the most important notes. No one seems to have put in print a confirmation of Dr. Pammel's early work nor that of Thos. Meehan, the great florist and nurseryman of Pennsylvania. If their observations are correct, it still remains to prove how common are the occurrences cited. In Missouri we found that while wood bees and honey bees rifled the honeysuckle tubular corollas without skipping any large percent of the blooms on the Capitol shrubbery plantings, similar bushes in bloom in several other parts of the city were apparently neglected. In this Mr. Ernst Schwarz helped me.

Dr. Pammel thinks that all the blooms in a red clover field may be side punctured as in Europe but there are so many fields where this is not so that quantitative studies are now in order to determine how much the clover honey yield in any important honey region is due to red clover, and how obtained.

It seems that some one could well rewrite my present notes or add to them under the following heads, of which we are quite ignorant:

1. Is there any definite relation between bees getting pollen to those getting honey from red clover fields?

(2). Is slitting of red clover florets general or only in certain seasons, or only in certain places by certain breeds of bees?

(3). Do honey bees usually follow wood bees or other insects perforating clover florets? Does the wood bee do the most of this work? Do honey bees follow wood bees more than other perforators of clover florets?

4. Do honey bees gather honeydew rather than clover nectar? Is this honeydew collected from other clover aphids than *A. bakeri*? Does this come mostly from stems and leaves, or from between florets and the stipules or bracts that subtend each red clover head?

(5). Is this honeydew from red clover always pinkish, or does it differ according to the particular aphid in epidemic on red clover? Do we surely know that bee-gathered red clover nectar is not pinkish like its honeydew seems to be in Idaho and Iowa cases?

(6). Do honeybees make their own holes or slits in red clover?

Of these heads, we have placed a parenthesis around those where the average beekeeper or farmer can help observe to advantage. Here is what the authors of these two rare papers says:

"Boring of Corollas from the Outside by Honey Bees." (Proc. Acad. Nat. Sci. Phila., 1878, Meeting of January 15, 1878.)—Mr. Thomas Meehan (observed late in 1877) referred to the practice of the humble-bee (*Bremus* sp.) in boring the corolla instead of entering by the mouth, even when there might be no great difficulty in doing so. A few years ago it was not noticed that any flowers were despoiled of their sweets in this extraneous way, but it was now known that the list of plants so treated was very large, and the humble-bee in America had already lost considerable of its reputation as an agent in the cross fertilization of flowers. He had carefully watched the honey-bee (*Apis mellifera* L.) for some years, but could never feel sure that it also bored the corollas in the same way, for though he had often seen them working from the outside, he suspected that they used the holes made by the humble-bee. Mr. Ryder, at one of our meetings, had insisted that the honey-bee did actually work occasionally in this way, and Mr. Meehan said he was thus led to go over the subject again, proving Mr. Ryder to be right. Late in the autumn, long after most other flowers were gone, and with no humble-bees about, scarlet sages, *Salvia splendens*, for nearly a week together, received the sole attention of the honeybees, which worked among the flowers in great numbers, in all cases boring the corollas near the base from the outside.

In connection with this fact, he said that among the scarlet sages were a large number of the pure white variety, but the bees visited them precisely as they did the scarlets, going to either indiscriminately. As bees usually contrive to work on one kind of flower only so long as there were plenty of that one kind, the fact of their working on these two colors at once showed that they did not make use of color only as a guide to the flowers, but that they had intelligence enough to know the *Salvia splendens* as well as we would, by experience, no matter under what color the species might be represented; and the experiments we read of, in which the bees failed to make use of

a fresh flower when its corolla was taken away, merely showed that the bee was not acting from an instinctive attraction by color, but had been deceived into the idea that the flower had faded away. Insects had evidently not only instinct, but were able to exercise a judgment created by experience. In a recent number of *Nature*, he said it was on record that a day moth, a *Macroglossum*, made an attempt to extract honey from the artificial flowers on a lady's bonnet, but it was so well able to profit by experience as not to make the attempt a second time.

He illustrated on the black-board the peculiar lever-like appendages or false anthers in *Salvia*, and said that these had been looked on as special arrangements for cross fertilization. When a bee entered it lifted the lever, and forced the true anther on the back of the insect, which thus carried pollen to another flower to be brushed against the stigma on entering. It was clear that, however reasonable this seemed hypothetically, it could have little foundation in fact in these long-tubed *Salvias*. An insect of the honey-bee size could not enter, and a smaller one that could, would not be large enough to reach the stigmas which were high up at the apex of the arch of the corolla. Only long-tongued moths could extract honey by way of the mouth; but as they thrust only their tongues into the flowers, keeping their bodies outside, the lever-like adaption to the bodies of insects, as suggested by the prevailing hypothesis, had no force.

Page 247. From L. H. Pammel, 1888, Pollination of *Phlomis tuberosa* and Perforation of Flowers, Trans. St. L. Acad. Sci., 5:241-277.

Darwin (25a) in his "Cross and Self-fertilization," etc., states that out of many hundred specimens of Red Clover examined by him nearly all were perforated, and he has even seen whole fields in the same condition. Thos. Belt (11) and others have noticed the same thing. It is quite as common for Red Clover to be perforated in this country as it is in Europe.

Pages 248-9.

In the summer of 1883, in the vicinity of La Crosse, Wis., I noticed large numbers of honey-bees on the flowers of Red Clover, and wondered whether they made perforations, or what they were doing. In some cases they obtained pollen, but in a vast majority of cases nectar was collected through perforations made by some other insect. Among beekeepers there is a notion that the Italian bee is able to get nectar from Red Clover. I doubt whether this is true, for in my experience I never found them collecting nectar in the normal way; they seemed to collect only through perforations made by some other insect. One thing will show, in part at least, why honey-bees go to the Red Clover at certain times and not on other occasions. It is a well known fact that the amount of nectar secreted by a plant varies according to season and locality. There are periods, as I have had occasion repeatedly to observe, when hive-bees cannot collect enough to supply their young, and they then freely use the

perforations made by *Bombus* and other insects; but when there is an abundance of nectar they pass over fields of Red Clover, and when *Monarda punctata* is in flower, and has a good supply of nectar, they will even pass over fields of White Clover and fly some distance to fields of wild Bergamot.

Although the rule seems to be that honey-bees do not perforate flowers, there seem to be exceptions, for no less an authority than Hermann Muller states that they perforate the flowers of *Erica totralix* (82 d'), using their mandibles to bite holes in the tube of the corolla. The tongue of the honey-bee is only 6 mm. long, so that it is not able to get the nectar otherwise in these early flowers. Later he found honey-bees collecting nectar in the normal way, but he failed to observe whether these late flowers were smaller or not. He has recorded one other case, that of *Nepeta Glechoma* (82c'), where *Apis* perforates the tube of the corolla in order to get nectar. On the 17th of May, 1873, he found a single specimen of *Apis* continually trying new flowers of *Nepeta Glechoma* (89 a) till one was found where *Bombus terrestris* had perforated the flower.

In this country, Meehan believes that *Apis* perforates the flowers of *Salvia splendens*. I think, however, that generally honey-bees only use the perforations made by other insects, and they are certainly quick to perceive these perforations. Muller records the most interesting case of *Salvia Sclarea* (92), in which the tube of the corolla is so long that the honey-bee is not able to get the nectar in a normal way. It made several attempts, but did not try to perforate the corollas. When, finally, it found several in which the corollas had just loosened, it immediately began to sip the little drops of nectar which still remained attached to the base of the corolla. It is certainly a clear case, for the insect tried in every way to get nectar, except by perforating the corolla.

Pages 255-6.

I have alluded to the manner in which *Xylocopa* makes perforations; I must also describe how this is done by *Bombus* and *Apis*. The mouth-parts are somewhat complex: the mandibles or upper jaws are developed for the purpose of biting; the maxillae and labium are brought into use when the bee takes a liquid into its pharynx. The maxillae are situated on each side of the labium, and consist of a flattened stipe at the base, then the rudimentary maxillary palpi, and from the stipe projects the triangular and deeply grooved lacinia. When the maxillae are brought close together a tube is formed which opens into the pharynx. The labium or lower lip consists of a central portion and two pairs of appendages, the paraglossae and labial palpi. The central portion of the labium is divided into a basal portion, the mentum and a terminal portion, the ligula. "The mentum is hinged to the submentum, which in turn is hinged to the maxillae by two chitinous rods." The labial palpi are deeply grooved, and when brought together form a tube. In flying from flower to

flower the insect carries its sucking apparatus stretched forward so that it is enabled to put it directly into the flower. The mouth-parts of the bee are held in a similar way when the tender cellular tissue is pierced with the tips of its maxillae. While many humble-bees are addicted to boring the tubes of corollas, they also resort to biting the tissues of the flowers by the aid of their mandibles.

The opinion is current that perforated flowers are not as productive as unperforated ones.

ACHIEVEMENTS OF THE LOCAL BEEKEEPERS' ASSOCIATIONS FOR THE YEAR 1925.

THE NORTHERN ILLINOIS AND SOUTHERN WISCONSIN BEEKEEPERS' ASSOCIATION.

During the year we held four field meetings in this territory. These did not have the attendance they deserved but certainly laid the ground work for much county organization. Two counties were organized, Stephenson and Ogle, and a lot of "pep" put in existing organized counties. Publicity of the foulbrood situation here was given by the newspapers and the farm advisors and we are beginning to get much needed inspection and I believe the next few years will see foulbrood under control, if not entirely eradicated.

The small beekeepers and farmers are beginning to know that when the moths destroy their bees there is something wrong and are asking the assistance of experts in overcoming this condition. While in 1924 our professional beekeepers had reason to complain bitterly of conditions, that has not been the case this past season and things are going along pretty much to our satisfaction. Mt. Morris College begins the teaching of beekeeping this year in its School of Agriculture. Newspapers are giving more space to bees and honey and are sending reporters to our meetings and on the whole conditions are improving in this territory.

COURT D. HUGGANS, *Secretary.*

WARREN COUNTY HONEY PRODUCERS' ASSOCIATION.

One foulbrood eradication demonstration was held at the home of Mr. Dan Hoover. Elmer Kommer was in charge. At the annual meeting held in September at the home of Mr. Samuel Goodsell, Mr. Wallace Smith of Cameron was elected president, while the other officers were retained. Following the business meeting, Mr. G. H. Cale of Hamilton, Ill., gave a very instructive and interesting talk concerning the management of bees. This was followed by an apiary inspection in the Goodsell bee yard which produced about 175 lbs. per colony this season, under the management of Gilbert Goodsell, a fourteen-year-old school boy.

GLENN L. GLASS, *Secy.-Treas.*

OGLE COUNTY.

To begin, we organized our Association July 16, 1925, with the following officers: President, G. L. Sauer, Polo; vice presidents, Chas. Mov, Polo, C. D. Huggans, Polo, and myself secretary-treasurer.

We had with us as speakers at that time, A. L. Kildow, D. E. Warren and E. W. Atkins. That was the last until we had our meeting February 24, with an attendance of about twenty. At that time all who wished to join we asked to come across with their dues, to which eleven responded. A number of speeches were made and topics discussed. C. D. Huggans was appointed to draw up resolutions and by-laws.

By request of State Inspector A. L. Kildow we called a meeting on March 19th, at that time we took in two more members, making a total of thirteen members to date; number in attendance at this meeting, 16. A number of interesting topics were discussed. A very interesting speech was made by Mr. Watt, and Mr. Kildow answered a number of questions that were asked.

This covers, in brief, our activities.

WM. T. HARDESTY, *Secretary.*

DEKALB COUNTY.

On Feb. 27, 1925, we held a meeting and organized the DeKalb County Association. Mr. Wm. Ritter of Genoa, was elected president; Mr. Frank Concidine of DeKalb vice president, and yours truly secretary and treasurer. I was recommended for inspector and appointed. In July we held a field meeting at the home of Mr. Wm. Marshall at DeKalb and had a fine crowd. Talk on foulbrood by Mr. Atkins was good.

My report on inspection work as follows: Yards visited 87, total swarms 2,018, inspected 532, A. F. B. 141, E. F. B. 11, burned 53. I think A. F. B. is well under control here now, considering two years ago we burned 161 in an area of 10 miles here at DeKalb. But you tell me what we are going to do with the box hives? I have got seven men up this way with over 300 of them. This year with some good hard work should see things in good shape by Fall.

On December 12, 1925, we held our annual meeting and the same officers were re-elected. At this meeting we discussed foulbrood and best way of treating. All were in favor of starting inspection early. Try to get all dead taken care of before robbing. Use the fire for treatment as general. Two field meetings to be held this year, one in each end of county. Left to President to call other meetings.

C. H. TUDOR, *Secretary.*

LIVINGSTON COUNTY.

We made a temporary organization September 30th, 1925, and appointed officers to hold until the third Tuesday in January. The meeting then had to be postponed until February 16, 1926, when we had what should have been the annual meeting. The officers, temporarily elected September 30th, 1925, were made permanent for the year 1926.

Inspection is progressing. More and more beekeepers are beginning to wake up to the fact that this work has to be done and to cooperate by county organizations. Since our February

meeting, the Inspector has been receiving letters from both large and small beekeepers to "come and inspect my bees as soon as you can."

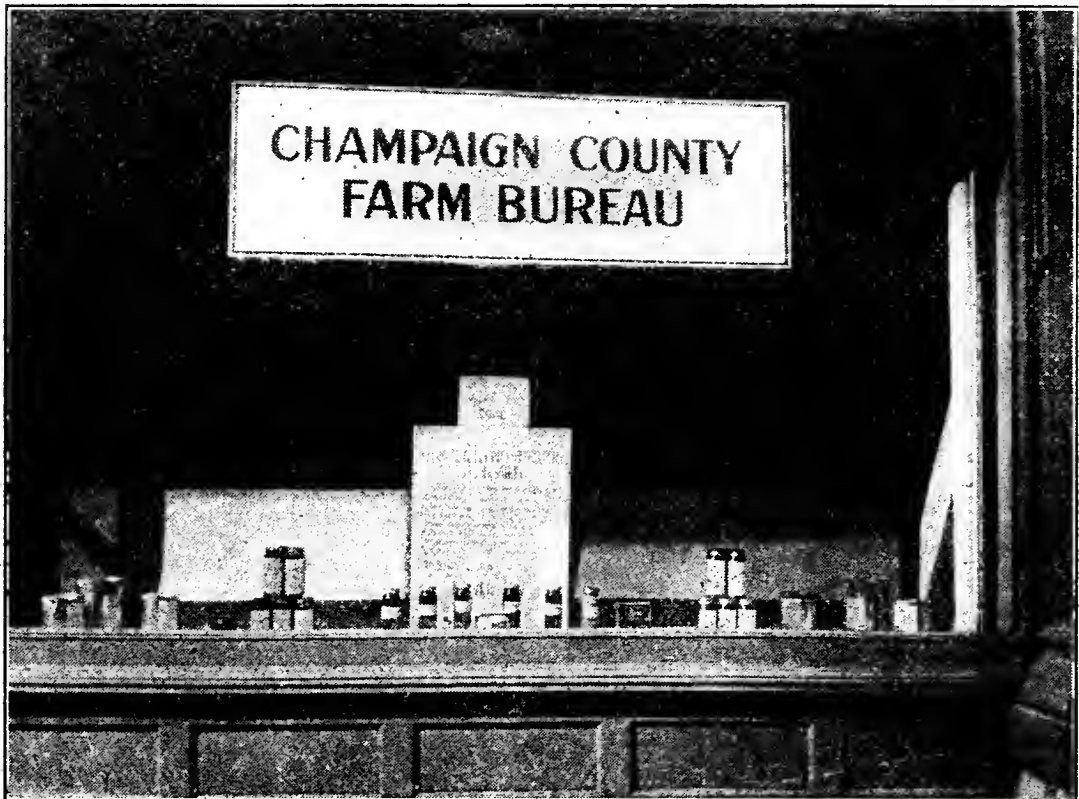
The writer is Inspector and I am very proud that I took the first step in trying to clean up disease two years ago. Now the work is progressing and organization makes it still better. Let's make 1926 a one hundred percent bee year with the cooperative system.

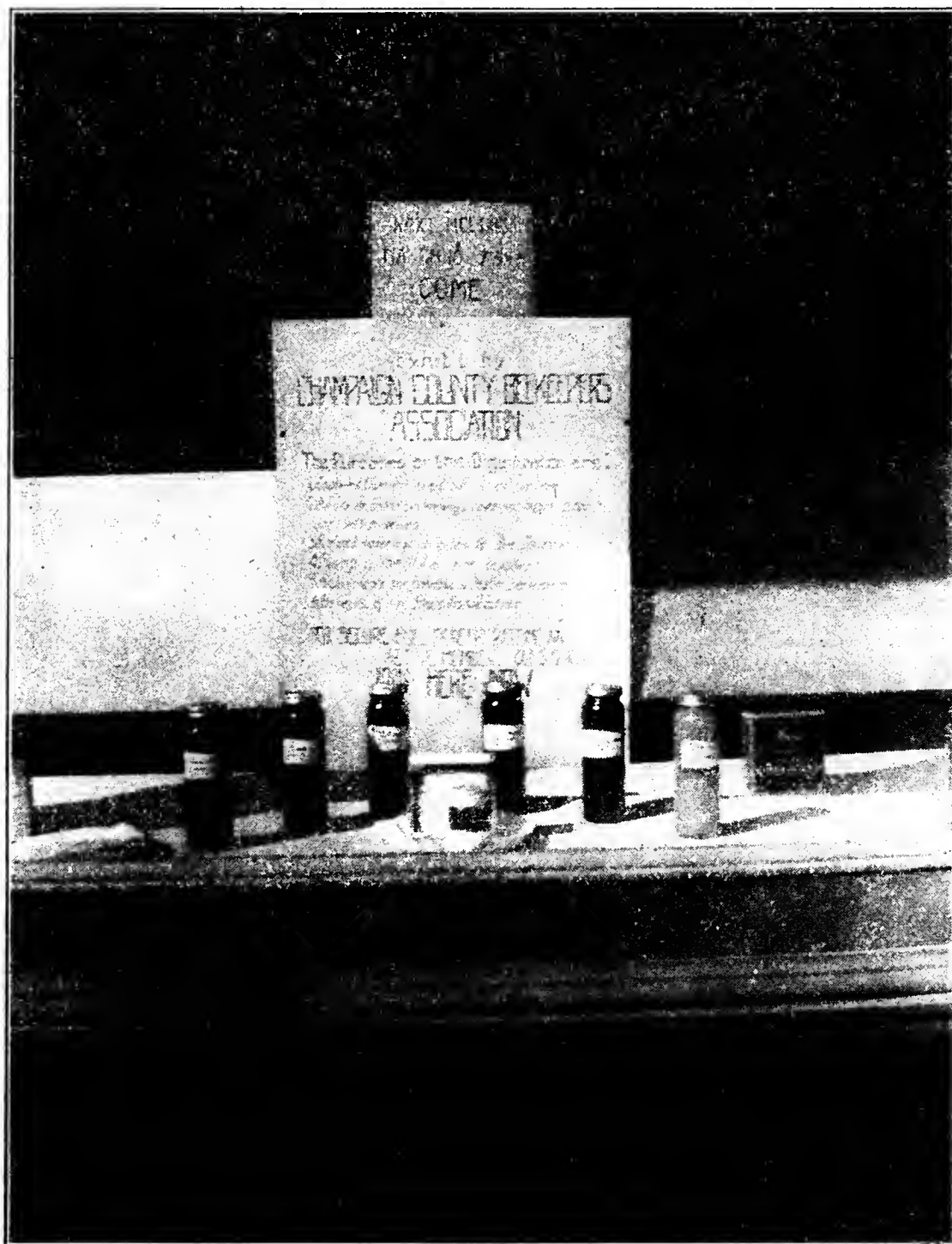
J. T. HENDRICKS, *President.*

CHAMPAIGN COUNTY.

The first meeting of the Champaign County Beekeepers' Association was held in Champaign on February 18, 1926, and the following officers elected: President, W. H. Force; vice president, M. E. Smith; secy.-treas., Geo. Rasmussen. The purposes of the organization are: 1. To cooperate in the eradication of foulbrood in Champaign County; 2. To give better advice on beekeeping as a means to better crops and prices; 3. To secure reduced rates on subscriptions to bee journals; 4. To effect savings in the purchase of bee supplies by ordering collectively; 5. To make the acquaintance and friendship of brother beekeepers; 6. To secure the benefits of affiliation with the State Association.

We have decided to make a very special effort to rid Champaign County of foulbrood. We have never had an inspector here and therefore foulbrood is very common in the county. Better beekeeping and marketing methods will be tackled later.





The first regular meeting after organization was held at the Farm Bureau in Champaign on March 10. During a short business session, Mr. W. H. Force, of Champaign, our President, was elected to be recommended as foulbrood Inspector for the county. After the business session short talks were given as follows:

Mr. Geo. E. King, of the University, spoke on "The Life History of the Honeybee." The pictures given in connection with this talk were interesting to the beginner as well as to the commercial honey producer.

Mr. A. L. Kildow, State Inspector of Apiaries, gave a short talk on foulbrood. Mr. V. G. Milum, of the University, talked on "Spring Management."

Besides the meeting of March 10th our new Association has been conducting a window display in the Farm Bureau window in Champaign. The purposes of our Association, and the benefits to be derived therefrom, as well as the invitation to join the Association were brought out on a poster in the center of the back of the window. Both comb and extracted honey in glass and tin were on display.

A comparison of the food value of 7 ounces of honey with eggs, milk, oranges and bananas, together with the prices on each brought forth a lively discussion with the County Home Bureau advisor. She did not believe the display was true to facts until I showed her Mr. Dadant's book on "First Lessons in Beekeeping," and the illustrations contained therein, and the Iowa Bulletin on which they are based. She was so completely won over to the value of honey, in the end, that she has consented to publish a good article as well as some honey recipes in the "Home Bureau Bulletin."

Our display also consisted of samples of orange, sage, alfalfa, and buckwheat honey, showing that honey varies in color and flavor with the blossom from which nectar is gathered.

Cakes, cookies and honey candy showed several uses to which honey could be put besides just on bread and biscuits. Folders like sample enclosed on "New Uses for Honey" were given out to the public, and also at our meeting on the 10th.

The results of this display were very satisfactory. The names of many interested in the Association were obtained.

Much favorable good will for the use of honey was obtained. The Home Bureau is now a booster for honey. Some sale of honey came directly as a result of the window.

SALINE AND GALLATIN COUNTIES.

A few beekeepers from Saline and Gallatin Counties met at the "Farm Bureau Office" in Harrisburg, Illinois, at 7:30 P. M., February 18th, 1925.

A splendid address was given by Mr. Rae, field man for the A. I. Root Company, and at the close of the address an Association was formed and affiliated itself with the State Association.

Twelve beekeepers joined the association at this meeting and later seven new members were added.

The following men were elected to office: Mr. Geo. B. Scherrer, President; Mr. R. L. Gates, Vice President; Mr. Everett Weaver, Secretary-Treasurer.

The members of the Association are: Geo. B. Scherrer, Alven Bell, Louie Vannis, Andrew Turner, Albert Pruett, Kellie E. Moye, Fred Devillez, Everett Weaver, W. W. Riegel, Walter Baldwin, John C. Small, W. S. Dorris, E. M. Glascock, J. F. Billman, H. W. Wilson, Otto Moye, J. H. Lamkin and W. O. Davis.

Five regular meetings were held by the Association and the sixth planned this year.

The first meeting was held May 8th, at 1:30 P. M. at the home of Alonzo Turner, and about 25 were present. Transferring was done and seasonal subjects were discussed.

The second meeting was held at John Billmans on May 22nd, at 1:00 P. M. About twenty-five beekeepers attended this meeting, several colonies were transferred, foundation wired and placed in frames and general subjects discussed.

The third meeting was held with a Queen Breeder in Eldorado, H. N. Wilson. This was a very successful meeting and about thirty-five people attended. The principal subject discussed was the queen.

The fourth meeting was held at the home of Kellie E. Moye. This was an all-day meeting with a picnic dinner on the lawn. Forty people attended this meeting and a general good time was had. Mr. Thomas, Mr. Simpson and Mr. Whitchurch made short talks, and Mr. Wooldridge, President of the State Association made the address of the day which was enjoyed by all.

The fifth meeting was held with Louie Vannis and Everett Weaver on September 3rd, in the afternoon. Ten people attended this meeting. They saw a nicely kept apiary at Mr. Vannis' place and enjoyed the visit. At Mr. Weaver's they visited and ate watermelons.

The sixth meeting was planned for Mr. Billmans, but was rained out.

EVERETT WEAVER, *Secretary.*

HENRY COUNTY HONEY PRODUCERS' ASSOCIATION.

As Secretary of the Henry County Honey Producers' Association, will make the following report:

During the season of 1925 we held five meetings, the first one was held at Rock Island, Ill., at the Harper House on Feb. 13th. Dr. A. C. Baxter, Springfield, A. L. Kildow, Putnam, A. G. Gill, Chicago, and Geo. Watt of Hamilton, Ill., were the speakers of this meeting, and in the evening at 7:40, Dr. Baxter went over to Davenport and gave a talk on "Bees and Honey" through Station W. O. C., while the rest of us had a receiving set at the hotel and received this excellent talk given by our President, Dr. Baxter, and received by thousands of beekeepers all over the

United States, and we believe that more such talks should be made for the benefit of the beekeepers.

The next meeting was held on Feb. 19th at Cambridge, Ill. At this meeting the members brought in their beeswax and we sent it in to have foundation made. This is done once a year, and hundreds of pounds of wax are sent in every year for the members, saving many dollars on comb foundation annually. At this meeting a committee was appointed to see the Kewanee Fair Board concerning an appropriation for premiums on Bees and Honey and a premium list of \$50.00 was recommended by this Association. The committee reported later that the Kewanee Fair Board had made the \$50.00 appropriation and that it was up to the members and all beekeepers to bring in their honey and observation hives.

The next meeting was held at Galva, Illinois, on March 24th, with M. G. Dadant of Hamilton, Ill., and A. L. Kildow of Putnam as speakers. L. S. Spreitsma, Secretary of the of the Kewanee Fair Association, was present and gave a talk on what they were willing to do for the beekeepers at the Fair in September.

The Beeware films were shown after this meeting at one of Galva's picture shows with a good attendance.

On August 18th a field meeting was held at the Apiary of Lawrence Peterson, 1315 Pine street, Kewanee, with basket dinners. E. M. Warren of Chicago, and J. H. Paarman of Academy of Science, Davenport, Iowa, were the speakers of the day. Prof. Paarman's subject was on "Honey Plants," while Mr. Warren spoke on Fall management. Senator Randolph Boyd, Galva, Ill., was present and made a talk to the beekeepers on the "Appropriation for Bee Inspection," and he said that he did not hesitate to vote for an appropriation for a good cause, and that he supported this appropriation for the beekeepers. Senator Boyd is a member of this Association.

The total membership of the Henry County Honey Producers for 1925 was 74 members with mostly up to date equipment and some record breaking crops were had by members from the excellent white clover flow in this locality in 1925.

Bee inspection work was carried on about the same as in other years and all was done that could be done in the line of stamping out the disease and, with only one exception, the disease is found along the outside of this county.

ELMER KOMMER, *Secretary.*

COOK COUNTY.

Our Association held four meetings during 1925. Meetings were held indoors in convenient down-town meeting places in January, February and May. A field demonstration meeting was held in July at the Apiary of E. A. Meineke, near Arlington Heights, Illinois.

Educational programs were put on at each meeting. Discussions were invited on the part of members and advantage is always taken of this opportunity. Prominent out-of-town speakers who addressed our meetings were B. F. Kindig, President American Honey Producers' League; James I. Hambleton, Director of Apiculture, Washington, D. C.; J. M. Barr, extensive Wisconsin beekeeper, and H. H. Root, of The A. I. Root Company.

Our Association was active in working for increased appropriation for bee inspection. Several trips were made to Springfield by members and one of our members, President J. R. Wooldridge of the Illinois State Association, camped in Springfield for some time in this cause.

Letters were written to all and personal calls made upon many of the Senators and Representatives in Cook and adjoining counties, which comprises about half of the representation in the state legislature.

Inspection did not progress well here in 1925. It was not possible to find near Chicago many suitable men who would engage to work for the amount the state offered to pay inspectors.

Cook County wants benefits itself but has always stood and worked for better beekeeping conditions for the whole state. We believe that as all prosper we prosper. Insofar as we have strength we want to pull for the best possible conditions throughout Illinois.

A. G. GILL, *Secretary.*

WOODFORD COUNTY.

The Woodford County Beekeepers' Association has made a rapid growth during the year 1925, almost doubling the membership of the year 1924.

The annual meeting was held at the Court House, Eureka. Talks and demonstrations were given by John F. Smith, Eureka, and Benj. H. Fischer, Roanoke. Later, March 23rd, a meeting was held at the Victory High School at Roanoke. M. G. Dadant, of Hamilton, addressed this meeting and several reels of motion pictures were shown.

On the 27th of August, the beekeepers of several counties gathered at the Lilly Orchards, in Tazewell County. G. H. Cale of the American Bee Journal, Geo. E. King and W. P. Flint, of the U. of I. and W. H. Snyder of Decatur were the principle speakers. Many from Woodford attended.

The last field meeting of the season was held at the Apiary of Benj. H. Fischer, of Roanoke, on the 26th of September. In

spite of the threatening rain we had a very large attendance, approximately one hundred beekeepers coming not only from Woodford and adjoining counties, but also from counties beyond and even from the State of Indiana. Addresses were given by G. H. Cale, of Hamilton; V. G. Milum, of the U. of I., and H. A. DeWerff, Woodford County Farm Advisor.

The members of the Woodford County Beekeepers' Association saved 12% on their bee supplies through cooperative purchasing.

ALFRED E. THOMAS, *Secretary*.

MCLEAN COUNTY.

The annual out-door meeting of the McLean County Beekeepers' Association was held on August 28, 1925, at Lilly Orchard, Lilly, Illinois. The speakers were G. H. Cale, of the Dadant Apiary at Hamilton, Illinois; George King and W. P. Flint, of the University of Illinois; State Inspector A. L. Kildow, of Putnam; Deputy Inspector J. H. Arvin, of Lilly, and W. H. Snyder, of Decatur. Their talks were highly instructive and greatly enjoyed by about an hundred beekeepers and their families. A basket picnic dinner was served at noon.

The annual indoor meeting will be held at the Farm Bureau building in Bloomington, on Saturday, March 27, at 7:30 P. M. Professor V. G. Milum of the University of Illinois, will speak on "Spring Management" and "Eradication of Foulbrood." There will be a general discussion of beekeeping problems, election of officers and a social time.

ELIZABETH SEIBEL, *Secretary*.

GRUNDY COUNTY.

One meeting was held of the Grundy County Association, on July 17th, at the Apiary of L. L. Ness, at Morris. The principal speakers were Mr. E. W. Atkins of Watertown, Wisconsin, and a representative of the A. I. Root Company. The topics were disease and marketing. Attendance about 45.

GORDON BELL, *Secretary*.

STEPHENSON COUNTY.

The Stephenson County Association meets the second Wednesday of each month. Mr. Bert Lee has been recommended for appointment for Deputy Inspector for Stephenson County, address, Pecatonica. He is a man of life-long experience and should make an efficient Inspector. Our President, W. H. McCaffrey, is an enthusiastic worker and is sparing no time to make the Association a success. When the roads and weather become settled, we expect a large gain in membership.

FRANK CLARK, *Secretary*.

MONTGOMERY COUNTY.

Last year we held a field meeting on September 2nd, starting at the Apiary of O. W. Kennett, Deputy Inspector, who was and is our President. Mr. Kennett demonstrated treatment for foulbrood, and Mr. Evans, from Decatur, showed how to carry a swarm home in your hat, if you have nothing else handy. Then Mr. Kennett and his wife passed around the watermelons, which were given prompt attention.

After a stop at Nokomis for dinner, the Apiaries of H. G. Holmes, Nokomis, Mr. Frank Zadel, Witt, and Mr. J. J. Durston, Irving, were visited. General discussion was the rule and questions from interested beekeepers were taken up and settled in this manner. While we would have liked more present, we feel that we did very well for the first attempt. The total membership for 1925 was 27. During 1926, we plan to have two meetings, one for June 16th, and one in the Fall.

WESLEY OSBORN, *Secretary.*

ANNUAL REPORT OF CHIEF INSPECTOR OF APIARIES.

In submitting my report for the year ending June 30th, 1925, I wish to say it is impossible to go into the details of each locality, but I will give a summary of the entire work.

The work was carried out on the principle of county organization and clean-up system. This principle of county organization is very satisfactory and will eventually result in a clean-up of the State.

Last year we had 22 counties with inspectors and now we have 41 counties. Some of these inspectors look after more than one county, while Cook, DuPage, and Will Counties each have more than one inspector.

Most of these counties have organized and are affiliated with the State Association, a few of the organizations have lost their "pep" but will undoubtedly be revived during the winter and will be ready to push ahead when Spring comes. The co-operation of the various Farm Bureaus have proven very beneficial both to the farmer and the beekeeper.

The north part of the State, being the part where commercial beekeeping is carried on, it appears that the beekeepers had lost sight of everything except the production of honey. But in the last year or two they have wakened to the fact that foulbrood is getting a firm hold on them and is detrimental to their production. So they decided to turn their attention to the fighting of this disease, and as a result are asking for inspectors and organization for the work. This was a very pronounced sentiment at a meeting of beekeepers at Rockford on October 20th.

The middle section of the State is under control with an occasional outbreak of disease which is soon taken care of.

The south half of the State seems to be practically free from disease, except in Madison and St. Clair Counties.

Last year we visited 2,025 Apiaries with 35,834 colonies. Of these there were 445 Apiaries having A. F. B. and 226 having E. F. B. This year we visited 3,471 Apiaries with 40,828 colonies and found 761 Apiaries to have A. F. B. and 113 to have E. F. B. We destroyed 943 diseased colonies that had American foulbrood—three-fourths of these colonies destroyed were in the north part of the State.

Our visits were mostly to infected and uncertain localities, rather than where they were already cleaned up. Now that we may make our work more profitable we would ask that the beekeepers in every county organize and then select a competent up-to-date bee man whom you can conscientiously recommend for County Inspector.

A. L. KILDOW, *Chief Inspector.*

1924	No. Apiaries Visited	No. Colonies	No. Apiaries A. F. B.	No. Apiaries E. F. B.	No. Colonies Destroyed
July.....	633	8,284	89	20	27
August.....	536	7,991	98	26	42
Sept.....	438	7,406	75	6	106
Oct.....	99	2,193	50	0	138
Dec.....		Illinois State Association Meeting			
1925					
Jan.....		Chicago Association Meeting			
Feb.....	1	1	1	0	1
Mar.....	36	1,644	11	0	10
Apr.....	259	3,407	65	8	111
May.....	866	1,594	204	37	345
June.....	602	8,308	168	16	163
Total.....	3,471	40,828	761	113	943

Report of the Deputy Apiary Inspectors For the Year 1925

SALINE AND GALLATIN COUNTIES.

Number of colonies visited in 1925, 897; number in boxes, 547; number in modern hives with straight combs, 350; number definitely promising to transfer in 1926, 114.

All beekeepers are urged to transfer out of old boxes, use modern hives, full sheets of foundation and always have an extra hive ready.

EVERETT WEAVER, *Inspector.*

WILLIAMSON AND UNION COUNTIES.

I inspected two counties, Williamson and Union. I found foulbrood in both. The region east of Herrin was the worst infected. Around 1,500 colonies were inspected in the two counties, with 200 cases of American and only three of European foulbrood, one at Carterville, one at Anna, and one east of Dongola.

In all cases the owners of the bees were willing to clean up and I did not have any trouble with anyone. I hope this next year will find conditions improved.

OTIS KELLEY, *Inspector.*

LA SALLE, FORD, IROQUOIS, KANKAKEE, AND LIVINGSTON COUNTIES.

The number of colonies inspected and the number found to have American foulbrood in each county are as follows:

La Salle, number inspected, 268, number diseased, 28; Ford, number inspected, 55, number diseased, 35; Iroquois, number inspected, 942, number diseased, 133; Kankakee, number inspected, 161, number diseased, 30; Livingston, number inspected, 467, number diseased, 30; a total of 1,893 inspected and 256 diseased. Of these 45 were treated and the balance were burned.

The work is coming along very finely. The beekeepers, large and small, are waking up since inspection work has been started here. County organizations are forming and as far as I can see into the future, it looks brighter for more work to be done and for more organizations to form.

I shall try to have Iroquois County organize this coming year as it is a powerful help in finding all the beekeepers with the least expense. The best way to stamp out the disease is to cooperate and that is what it is coming to now. We all want to keep going and keep up progress.

J. T. HENDRICKS, *Deputy Inspector.*

EDGAR, CLARK, AND COLES COUNTIES.

American foulbrood is widely scattered through all these counties. Sixty percent of the Apiaries inspected were infected. The disease seems to be scattered mostly by poor management. Where colonies were found beyond redemption they were burned. The Inspector was cordially received by the beekeepers, and, with their help, I feel that the disease can be brought under control to a reasonable degree. About one-half the bees were in box hives or in frame hives with crossed combs. I visited 77 apiaries, examining 914 colonies of which 191 were diseased, 142 were treated and the balance burned.

CHAS A. KRUSE, *Inspector.*

HENRY, KNOX, BUREAU, MERCER, ROCK ISLAND, WARREN AND WHITESIDE COUNTIES.

The work done in 1925 covers mostly three counties, although trips were made into Rock Island, Bureau, Knox, and Mercer Counties by the request of beekeepers but only one yard was found with foulbrood, in Knox County.

Considerable work was done in Henry, Whiteside and Warren Counties, where 31 colonies were burned. In the balance of the apiaries infected, instructions were given on how to shake the bees successfully, and, upon my second visit, I found, in most cases, that a very good job had been done.

Black bees are fast being replaced by Italians and some wonderful results have been obtained with Italians in cleaning up European foulbrood. When I visited the apiary of James Steiner, Genesco, in the Fall of 1924, I found his apiary badly infected with European, some of it rotten, and Mr. Steiner was asked to requeen, which he did in the Spring of 1925. Upon my visit in August, I found it all clean except one case, where the bees had killed the queen he tried to introduce and reared one of their own.

During the year, I attended three meetings besides the ones held by our County Association, one in Warren County, one in Henry County, and one in Rock Island County. The last one was held at the apiary of Dow Ripley, Illinois City, with beekeepers in attendance also from Mercer and Rock Island Counties. At this meeting we organized the Rock Island-Mercer Beekeepers' Association with a good list of beekeepers who are making a steady growth.

The meeting in Warren County was held by the Warren County Beekeepers' Association, with a good attendance, at the apiary of Dan Hoover, Monmouth, an up-to-date beekeeper of that county.

The Henry County meeting was held at the farm of H. S. Oliver, Kewanee. American foulbrood was found in the yard, so a demonstration of shaking was given for the benefit of those attending the meeting.

I inspected a total of 1,359 colonies, finding 177 cases of American foulbrood, and 123 of European foulbrood. 243 of the colonies inspected were in box hives.

ELMER KOMMER, *Inspector*.

KANE COUNTY.

I received my appointment so late in 1925, I was not able to do much inspecting. I inspected the following in the southern part of Kane County: 12 apiaries, totaling 108 colonies, with 11 American foulbrood and 2 European foulbrood. Eight colonies were burned.

ROSS R. MORRILL, *Inspector*.

DU PAGE COUNTY.

As my inspection was spare time work, I did not get in much territory. I inspected part of Du Page County and found some cases of European foulbrood, but none of American.

H. A. INGLEMOSE, *Inspector*.

GREEN, MADISON, MENARD, LOGAN, CASS, SANGAMON, MORGAN, AND PIKE COUNTIES.

I found disease as follows: Green County, 520 colonies inspected, 182 with American foulbrood, in the northern part; Madison County, inspected 24 colonies on a special call, where foulbrood had just been cleaned up; Menard County, inspected 171 colonies, 4 with American foulbrood, and 8 with European; Logan County, inspected 178 colonies, with one case of American foulbrood; Cass County, inspected 562 colonies, 9 with American foulbrood, and 21 with European, the west side badly infected with American; Sangamon County, inspected 509 colonies, 9 with American foulbrood, and 13 with European; Morgan County, inspected 161 colonies, all clean; Pike County, inspected 954 colonies, 91 with American foulbrood, and 4 with European. I made more than one trip to most of these Apiaries and destroyed most of the disease.

HARRY L. KING, *Inspector*.

.....COUNTY.

During 1925, I visited 67 apiaries, containing 481 colonies of bees, 69 with American foulbrood, and 24 with European. I treated 12 for American and burned 14. Travelled by auto 329 miles, worked 18 days.

JOHN LA FOND, *Inspector*.

QUINCY, ILL.

1,111 colonies were inspected, 41 having American foulbrood, 24 with European, and with 118 colonies in box hives. All the cases of American foulbrood were either burned or treated and all European cases treated.

The disease conditions are very much improved, but I still

find unfavorable conditions prevailing, so feel it necessary to continue the search for new cases which are due, I believe, to the selling of foulbrood honey from other uninspected Apiaries, particularly those of other states, with our bordering state, Missouri, mentioned.

E. W. RITTLER, *Inspector*.

PULASKI, ALEXANDER AND MASSAC COUNTIES.

In Pulaski County, I inspected 502 colonies. Of these four had American foulbrood, one had European. As this territory was covered last year, it was in fairly good condition. In Alexander County, I found foulbrood worse than in any of the three southern counties of the state. In this county, 525 colonies were inspected, there being nine cases of American foulbrood. The apiaries having disease were re-visited, after giving them time to get rid of it. I found that most of the beekeepers knew they had disease and they were willing to try and get rid of it. In Massac County, I found conditions excellent. There were 366 colonies inspected and no disease found. There were some good beekeepers here and they would like to form an Association.

WAYNE LINGENFELTER, *Inspector*.

MOULTRIE, DOUGLAS, AND PIATT COUNTIES.

I inspected 1,596 colonies in Moultrie, Douglas, and Piatt Counties. 386 colonies were in box hives. 127 had American foulbrood, and 12 had European.

PAUL R. SMITH, *Inspector*.

WOODFORD COUNTY.

In my inspection work during 1925, I inspected 120 Apiaries with a total of 876 colonies. 112 colonies were diseased in 40 apiaries. 72 cases of A. F. B. were found in 25 apiaries and 40 cases of E. F. B. were found in 15 apiaries.

Of the 112 infected colonies 36 were treated and 17 were burned by the inspector. The balance were treated or burned by the owners.

Slightly over 15% of the total number of colonies were infected which is lower as compared with 20% in 1924. 33% of the apiaries were infected as compared with 47% in 1924.

About 29% of the total number of colonies were in box hives or cross built combs.

I spent most of the time in the western and northwestern part of the county, that part having the most box hives and the most disease. Some sections were practically all box hives.

Only a few second inspections were made and conditions were found improved.

BENJAMIN H. FISCHER, *Inspector*.

MONTGOMERY, MACOUPIN, MADISON, AND CHRISTIAN COUNTIES.

During the season of 1925, I did inspection work in the following counties: Montgomery and Macoupin, also some in Madison and Christian.

Number of colonies inspected, 2,916; number of apiaries visited, 296; number with American foulbrood, 129; number with European foulbrood, 87.

Mostly all colonies that were affected with A. F. B. were burned. Those whom I permitted to transfer their diseased colonies had no reappearance of disease on my second examination. My instructions were carried out in every case with exception of one. I destroyed his diseased colonies by burning them; he says he will gladly obey orders hereafter.

I found many beekeepers that knew nothing of bee diseases, and also were unaware that there was an inspection on them. Many who lost all of their bees with bee diseases thought that it was only the moth that was killing them. Every effort was made by me to enlighten them on how to control and prevent disease among bees. The importance of keeping their bees in movable frame hives was also explained. I also gave a demonstration on disease and better beekeeping here at my place last fall, which was very largely attended, and several counties were represented.

4 Our main honey flow in this locality comes from White Clover and Sweet Clover. The acreage of sweet clover is increasing from year to year. We occasionally have a fair Fall flow from heartsease, spanish needles, and asters.

O. W. KENNETT, *Inspector.*

FRANKLIN, JEFFERSON, JACKSON, WILLIAMSON, AND HAMILTON COUNTIES.

In the year of 1925, I inspected in Franklin County, Illinois, 2,496 hives of bees; in Jefferson County, 23 hives; Jackson County, 41; Williamson County, 22, and Hamilton County, 507.

In Franklin County I found A. F. B. in 46 hives. Some of the hives were burned and some treated, and as far as I know A. F. B. did not appear again where it was cleaned up. I found, in 1924, some E. F. B.; in 1925 I did not find any E. F. B.

The most of those having E. F. B. re-queened with Italian queens and they seemed to clean it all up. I think if we depend on the average beekeeper to clean up A. F. B. it will be scattered more than cleaned up. In most cases they do not know how to do the job and if it is left to them they, in some cases, do not try, and if they do try they scatter it more than clean up.

R. C. MERIDETH, *Inspector.*

REPORT OF DEPUTY INSPECTOR, CHICAGO.

I inspected 326 apiaries, comprising 3,888 colonies of bees. 436 had American foulbrood, and I shook or burned over 286 colonies. The number of diseased apiaries were 76, and 58 of them were entirely cleaned up, leaving 18 still to be attended to.

H. M. CROUCH, *Inspector*.

HANCOCK COUNTY.

It was not possible to do much work the past year and a total of seven days was all that was given to inspection. I examined 209 colonies, finding 76 with American foulbrood. These I treated leaving the yards entirely clean. This looks like a high percentage, but owing to my limited time, I only inspected where I had reason to believe American foulbrood existed.

GEO. R. WATT, *Inspector*.

CHRISTIAN AND SHELBY COUNTIES.

I visited 238 apiaries, comprising 2,128 colonies, finding 19 apiaries and 48 colonies with foulbrood. There was only 6 cases of European and the rest being American. I destroyed 32 colonies outright.

FRANK BISHOP, *Inspector*.

PERRY AND JACKSON COUNTIES.

During the season of 1925 I examined 1,361 colonies in 130 yards. Forty yards were diseased with American foulbrood, about 129 colonies. All of these were carefully treated or destroyed.

I only examined about 125 colonies in Jackson County, five yards. Two of them had foulbrood, in Carbondale. If we clean up in this and in other states, we will have to cooperate and educate, all working together.

ROY I. ANNEAR, *Inspector*.

LOGAN COUNTY.

I inspected 834 colonies of bees in Logan County, of which 57 had American foulbrood and 8 European foulbrood. Several yards had American bad in the Spring. I reinspected in September and found no trace of disease. The owner or myself had cleaned up. In some cases the owner paid me to come back and help him.

S. A. TYLER, *Inspector*.

DU PAGE COUNTY.

I visited 23 apiaries with 178 colonies of bees, 16 with American foulbrood. I worked six days in all, but it was too late in the season to do much. Eight of the colonies were destroyed. I only inspected in a part of Du Page County.

WM. J. WALLAMHS, *Inspector*.

KANE AND McHENRY COUNTIES.

This comprises my work up to July 25th. After that I did no work on account of the honeyflow being gone and the bees would rob, doing more harm than good. I inspected 705 colonies of which 141 had American foulbrood. 25 of them were burned. I hope to be able to do more this year. Some of the remaining diseased colonies have been treated but I cannot tell until August how many will be clean. All, I hope.

E. J. BRYANT, *Inspector*.

OGLE, WHITESIDE, CARROLL, AND STEPHENSON COUNTIES.

During 1925, I inspected 3,417 colonies of bees in the above counties. There were 518 diseased, and I burned 395 of them. Most of these bees were found in Ogle County.

S. S. CLAUSEN, *Inspector*.

LA SALLE, DU PAGE, WILL, KENDALL, LIVINGSTON, AND KANKAKEE COUNTIES.

The total number of days of inspection was 29. Approximately 200 colonies were found with American foulbrood, and about 45 with European. 180 colonies were burned. The European foulbrood infection is very light among Italian bees and practically nothing was done with it except to urge the owners to requeen. The American foulbrood infection is about 8-10% of what it was two years ago when this work was started in this area.

My personal opinion of the Hutzelman solution treatment is that it is practical on dry super combs, but the best, safest and cheapest and sure method on equipment with dead brood and honey in it is the bonfire route.

GORDON BELL, *Inspector*.

McLEAN AND TAZEWELL COUNTIES.

In McLean County I visited 46 apiaries, with 507 colonies. 34 colonies in 9 yards had European foulbrood, and 54 colonies in 10 apiaries had American foulbrood. There were 108 box hives in 22 apiaries. $6\frac{1}{2}\%$ of the total colonies inspected had European foulbrood and $10\frac{3}{5}\%$ had American foulbrood.

In this county, 27 colonies were burned, either by the owner or by the inspector. Conditions were found to be much better in those sections of the county gone over in 1924. The greater part of the disease, especially the American foulbrood, being found in new areas. All known cases of American were either treated or destroyed.

In Tazewell County I visited 110 apiaries, with 988 colonies, 21 colonies in 10 yards had European foulbrood, and 123 colonies in 29 yards had American. There were 235 colonies in box hives

in 50 apiaries. 2% of the total number of colonies inspected had European, and 13½% had American foulbrood.

In this county 59 colonies were destroyed, either by the owner or by the inspector. Known disease (American), was carried over until Spring for treatment, in three apiaries, owing to the lateness of the season. A part of the above figures are for reinspection.

The greater part of the American foulbrood found in this county was in the western and northern part. The beekeepers as a whole have shown fine cooperation.

JAMES D. ARVIN, *Inspector*.

CONSTITUTION AND BY-LAWS OF THE ILLINOIS STATE BEEKEEPERS' ASSOCIATION.

Constitution.

Adopted Feb. 26, 1891.

ARTICLE I.

This organization shall be known as The Illinois State Beekeepers' Association, and its principal place of business shall be at Springfield, Ill.

ARTICLE II.—OBJECT.

Its object shall be to promote the general interests of the pursuit of bee-culture.

ARTICLE III.—MEMBERSHIP.

Section 1. Any person interested in apiculture may become a member upon the payment to the Secretary of an annual fee of one dollar and fifty cents (\$1.50). (Since amended to \$1.75). (Amendment adopted at annual meeting, December, 1919): And any affiliating association, as a body, may become members on the payment of an aggregate fee of fifty cents (50c) per member, as amended November, 1910.

Sec. 2. Any person may become honorary member by receiving a majority vote at any regular meeting.

ARTICLE IV.—OFFICERS.

Section 1. The officers of this association shall be, President, Vice President, Secretary and Treasurer. (Since amended to include 5 regional Vice Presidents.) Their terms of office shall be for one year, or until their successors are elected and qualified.

Sec. 2. The President, Secretary and Treasurer shall constitute the Executive Committee.

Sec. 3. Vacancies in office—by death, resignation and otherwise—shall be filled by the Executive Committee until the next annual meeting.

ARTICLE V.—AMENDMENTS.

This Constitution shall be amended at any annual meeting by a two-thirds vote of all the members present—thirty days' notice having been given to each member of the association.

By-Laws.

ARTICLE I.

The officers of the association shall be elected by ballot and by a majority vote.

ARTICLE II.

It shall be the duty of the President to call and preserve order at all meetings of this association; to call for all reports of officers and committees; to put to vote all motions regularly seconded; to count the vote at all elections, and declare the results; to decide upon all questions of order, and to deliver an address at each annual meeting.

ARTICLE III.

The Vice Presidents shall be numbered, respectively, First, Second, Third, Fourth and Fifth, and it shall be the duty of one of them, in his respective order, to preside in the absence of the President.

ARTICLE IV.

Section 1. It shall be the duty of the Secretary to report all proceedings of the association, and to record the same, when approved, in the

Secretary's book; to conduct all correspondence of the association, and to file and preserve all papers belonging to the same; to receive the annual dues and pay them over to the Treasurer, taking his receipt for the same; to take and record the name and address of every member of the association; to cause the Constitution and By-Laws to be printed in appropriate form and in such quantities as may be directed by the Executive Committee from time to time, and see that each member is provided with a copy thereof; to make out and publish annually, as far as practicable, statistical table showing the number of colonies owned in the spring and fall, and the amount of honey and wax produced by each member, together with such other information as may be deemed important, or be directed by the Executive Committee; and to give notice of all meetings of the association in the leading papers of the State, and in the bee journals at least four weeks prior to the time of such meeting.

Sec. 2. The Secretary shall be allowed a reasonable compensation for his services, and to appoint an assistant Secretary if deemed necessary.

ARTICLE V.

It shall be the duty of the Treasurer to take charge of all funds of the association, and to pay them out upon the order of the Executive Committee, taking a receipt for the same; and to render a report of all receipts and expenditures at each annual meeting.

ARTICLE VI.

It shall be the duty of the Executive Committee to select subjects for discussion and appoint members to deliver addresses or read essays, and to transact all interim business.

ARTICLE VII.

The meeting of the association shall be, as far as practicable, governed by the following order of business:

- Call to order.
- Reading minutes of last meeting.
- President's address.
- Secretary's report.
- Treasurer's report.
- Reports of committees.
- Unfinished business.
- Reception of members and collection.
- Miscellaneous business.
- Election and installation of officers.
- Discussion.
- Adjournment.

ARTICLE VIII.

These By-Laws may be amended by a two-thirds vote of all the members present at any annual meeting.

C. E. YOCUM,
AARON COPPIN,
GEO. F. ROBBINS.

Following is a copy of the law passed by the Illinois Legislature May 19, and signed by the Governor June 7, 1911, to take effect July 1, 1911:

STATE FOULBROOD LAW. State Inspector of Apiaries.

Preamble.

§ 1. State Inspector of Apiaries — appointment — term — assistants — per diem.

§ 2. Foulbrood, etc. — what declared nuisances — inspection — notice to owner or occupant — treatment — abatement of nuisance — appeal.

§ 3. Annual Report.

§ 4. Penalties.

House Bill No. 670.

(Approved June 7, 1911.)

AN ACT to prevent the introduction and spread in Illinois of foulbrood among bees, providing for the appointment of a State Inspector of Apiaries and prescribing his powers and duties.

Whereas, the disease known as foulbrood exists to a very considerable extent in various portions of this State, which, if left to itself, will soon exterminate the honey bees; and

Whereas, the work done by an individual beekeeper or by a State Inspector is useless so long as the official is not given authority to inspect and, if need be, to destroy the disease when found; and

Whereas, there is a great loss to the beekeepers and fruit growers of the State each year by the devastating ravages of foulbrood.

Section 1. *Be it enacted by the People of the State of Illinois, represented in the General Assembly:* That the Governor shall appoint a State Inspector of Apiaries, who shall hold his office for the term of two years, and until his successor is appointed and qualified, and who may appoint one or more assistants, as needed, to carry on the inspection under his supervision. The Inspector of Apiaries shall receive for each day actually and necessarily spent in the performance of his duties the sum of four dollars to be paid upon bills of particulars certified to as correct by the said State Inspector of Apiaries, and approved by the Governor.

Sec. 2. It shall be the duty of every person maintaining or keeping any colony or colonies of bees to keep the same free from the disease known as foulbrood and from every contagious and infectious disease among bees. All beehives, beehouses or appurtenances where foulbrood or other contagious or infectious diseases among bees exists, are hereby declared to be nuisances to be abated as hereinafter prescribed. If the Inspector of Apiaries shall have reason to believe that any apiary is infected by foulbrood or other contagious disease, he shall have power to inspect, or cause to be inspected, from time to time, such apiary, and for the purpose of such inspection he, or his assistants, are authorized during reasonable business hours to enter into or upon any farm or premises, or other building or place used for the purpose of propagating or nuturing bees. If said Inspector of Apiaries, or his assistants, shall find by inspection that any person, firm or corporation is maintaining a nuisance as described in this section, he shall notify in writing the owner or occupant of the premises containing the nuisance so disclosed of the fact that such nuisance exists. He shall include in such notice a statement of the condition constituting such nuisance, and order that the same be abated within a specified time and a direction, written or printed, pointing out the methods which shall be taken to abate the same. Such notice and order may be served personally or by depositing the same in the postoffice properly

stamped, addressed to the owner or occupant of the land or premises upon which such nuisance exists, and the direction for treatment may consist of a printed circular, bulletin or report of the Inspector of Apiaries, or an extract from same.

If the person so notified shall refuse or fail to abate said nuisance in the manner and in the time prescribed in said notice, the Inspector of Apiaries may cause such nuisance to be abated, and he shall certify to the owner or person in charge of the premises the cost of the abatement and if not paid to him within sixty days thereafter the same may be recovered, together with the costs of action, before any court in the State having competent jurisdiction.

In case notice and order served as aforesaid shall direct that any bees, hives, beehives or appurtenances shall be destroyed and the owner of such bees, hives, beehives or appurtenances shall consider himself aggrieved by said order, he shall have the privilege of appealing within three days of the receipt of the notice to the County Court of the county in which such property is situated. The appeal shall be made in like manner as appeals are taken to the County Court from judgments of justices of the peace. Written notice of said appeal served by mail upon the Inspector of Apiaries shall operate to stay all proceedings until the decision of the County Court, which may, after investigating the matter, reverse, modify or affirm the order of the Inspector of Apiaries. Such decision shall then become the order of the Inspector of Apiaries, who shall serve the same as hereinbefore set forth and shall fix a time within which such decision must be carried out.

Sec. 3. The Inspector of Apiaries shall, on or before the second Monday in December of each calendar year, make a report to the Governor and also to the Illinois State Beekeepers' Association, stating the number of apiaries visited, the number of those diseased and treated, the number of colonies of bees destroyed and the expense incurred in the performance of his duties.

Sec. 4. Any owner of a diseased apiary or appliances taken therefrom, who shall sell, barter or give away any such apiary, appliance, queens or bees from such apiary, expose other bees to the danger of contracting such disease, or refuse to allow the Inspector of Apiaries to inspect such apiary, or appliances, shall be fined not less than \$50 nor more than \$100.

Approved June 7, 1911.

(Bill passed in the 50th General Assembly.)

BEEKEEPERS' ASSOCIATION.

THE ORIGINAL BILL.

- § 1. Appropriates \$1,000 per annum— § 3. Annual Report.
 provisio.
- § 2. How drawn.

AN ACT making an appropriation for the Illinois State Beekeepers' Association.

Whereas, The members of the Illinois State Beekeepers' Association have for years given much time and labor without compensation in the endeavor to promote the interests of the beekeepers of the State; and,

Whereas, The importance of the industry to the farmers and fruit-growers of the State warrants the expenditure of a reasonable sum for the holding of annual meetings, the publication of reports and papers containing practical information concerning beekeeping, therefore, to sustain the same and enable this organization to defray the expenses of annual meetings, publishing reports, suppressing foulbrood among bees in the State, and promote the industry in Illinois;

Section 1. *Be it enacted by the People of the State of Illinois, represented in the General Assembly:* That there be and is hereby appropriated for the use of the Illinois State Beekeepers' Association the sum of one thousand dollars (\$1,000) per annum for the year 1917-1918, for the purpose of advancing the growth and developing the interests of the beekeepers of Illinois, said sum to be expended under the direction of the Illinois State Beekeepers' Association for the purpose of paying the expenses of holding annual meetings, publishing the proceedings of said meetings suppressing foulbrood among bees in Illinois, etc.

Provided, however, That no officer or officers of the Illinois State Beekeepers' Association shall be entitled to receive any money compensation whatever for any services rendered for the same, out of this fund.

Sec. 2. That on the order of the President, countersigned by the Secretary of the Illinois State Beekeepers' Association, and approved by the Governor, the Auditor of Public Accounts shall draw his warrant on the Treasurer of the State of Illinois in favor of the treasury of the Illinois State Beekeepers' Association for the sum herein appropriated.

Sec. 3. It shall be the duty of the Treasurer of the Illinois State Beekeepers' Association to pay out of said appropriation, on itemized and receipted vouchers, such sums as may be authorized by vote of said organization on the order of the President countersigned by the Secretary, and make annual report to the Governor of all such expenditures, as provided by law.

Itemized in the Omnibus Bill as follows:

For shorthand reporting.....	\$ 200
For postage and stationery.....	50
For printing	550
Expense of meetings.....	200

Total amount of the appropriation.....\$1,000

The Assembly ruled that this is not to be paid in *lump*, but drawn itemized accounts.

CODE OF RULES AND STANDARDS FOR GRADING AP- IARIAN EXHIBITS AT FAIRS AS ADOPTED BY ILLINOIS STATE BEEKEEPERS' ASSOCIATION.

COMB HONEY.

Rule 1. Comb honey shall be marked on a scale of 100, as follows:

Quantity	40	Style of display.....	20
Quality	40		

Rule 2. Points of quality should be:

Variety	5	Straightness of comb.....	5
Clearness of capping.....	10	Uniformity	5
Completeness of capping.....	5	Style of Section.....	5
Completeness of filling.....	5		

Remarks: 1. By variety is meant different kinds, with regard to the sources from which the honey is gathered, which adds much interest to an exhibit.

2. By clearness of capping is meant freedom from travel stain and a water soaked appearance. This point is marked a little high, because it is a most important one. There is no better test of the quality of comb honey than the appearance of the cappings. If honey is taken off at the proper time, and cared for as it should be, so as to preserve its original clear color, body and flavor will take care of themselves, for excellence in the last two points always accompanies excellence in the first. Clover and basswood honey should be white; heartsease, a dull white tinged with yellow; and Spanish needle, a bright yellow.

3. By uniformity is meant closeness of resemblance in the sections composing the exhibit.

4. By style is meant neatness of the sections, freedom from propolis, etc.

5. Honey so arranged as to show every section should score the highest in style of display, and everything that may add to the tastiness and attractiveness of an exhibit should be considered.

EXTRACTED HONEY.

Rule 1. Extracted honey should be marked on a scale of 100, as follows:

Quantity	40	Style and display.....	15
Quality	45		

Rule 2. Points of quality should be:

Variety	10	Style of package.....	10
Clearness of color.....	5	Variety of package.....	5
Body	5	Finish	5
Flavor	5		

Remarks: 1. Light clover honey pouring out of a vessel is a very light straw color; Spanish needle, a golden hue, and dark clover honey, a bluish amber.

2. Style of package is rated a little high, not only because it consists the principal beauty of an exhibit of extracted honey, but also because it involves the best package for marketing. We want to show honey in the best shape for the retail trade, and that, in this case, means

the most attractive style for exhibition. Glass packages should be given the preference over tin; flint glass over green, and smaller vessels over larger, provided the latter run over one or two pounds.

3. By variety of package is meant chiefly different sizes; but small pails for retailing, and, in addition, cans or kegs (not too large) for wholesaling, may be considered. In the former case, pails painted in assorted colors, and lettered "Pure Honey," should be given the preference.

4. By finish is meant capping, labeling, etc.

5. Less depends upon the manner of arranging an exhibit of extracted than of comb honey, and for that reason, as well as to give a higher number of points to style of package, a smaller scale is allowed for style of display.

SAMPLES OF COMB AND EXTRACTED HONEY.

Rule 1. Single cases of comb honey, entered as such for separate premiums, should be judged by substantially the same rules as those given for a display of comb honey, and samples of extracted, by those governing displays of extracted honey.

Rule 2. Samples of comb or extracted honey, as above, may be considered as part of the general display in their respective departments.

GRANULATED HONEY.

Rule 1. Candied or granulated honey should be judged by the rules for extracted honey, except as below.

Rule 2. Points of quality should be:

Variety	10	Style of package.....	10
Fineness of grain.....	5	Variety of package.....	5
Color	5	Finish	5
Flavor	5		

Rule 3. An exhibit of granulated honey may be entered or considered as part of a display of extracted honey.

NUCLEI OF BEES.

Rule. Bees in observation hives should be marked on a scale of 100, as follows:

Color and markings.....	30	Quietness	5
Size of bees.....	30	Style of comb.....	5
Brood	10	Style of hive.....	10
Queen	10		

Remarks: 1. Bees should be exhibited only in the form of single frame nuclei, in hives or cages with glass sides.

2. Italian bees should show three or more bands, ranging from leather color to golden or light yellow.

3. The markings of other races should be those claimed for those races in their purity.

4. A nucleus from which the queen is omitted should score zero on that point.

5. The largest quantity of brood in all stages or nearest to that should score the highest in that respect.

6. The straightest, smoothest and most complete comb, with the most honey consistent with the most brood, should score the highest in that respect.

7. That hive which is neatest and best made and shows the bees, etc., to the best advantage should score the highest.

QUEEN BEES.

Rule. Queen bees in cages should be marked on a scale of 100, as follows:

Quantity 40 Quality and variety..... 40
Style of caging and display..... 20

Remarks: 1. The best in quality consistent with variety should score the highest. A preponderance of Italian queens should outweigh a preponderance of black ones, or, perhaps, of any other race or strain; but sample queens of any or all varieties should be duly considered. Under the head of quality should also be considered the attendant bees. There should be about a dozen with each queen.

2. Neatness and finish of cages should receive due consideration, but the principal points in style are to make and arrange the cages so as to show the inmates to the best advantage.

BEESWAX.

Rule. Beeswax should be marked on a scale of 100, as follows:

Quantity 40 Quality 40
Style of display..... 20

Remarks: 1. Pale, clear, yellow specimens should score the highest, and the darker grades should come next in order.

2. By style is meant chiefly the forms in which the wax is molded and put up for exhibition. Thin cakes or small pieces are more desirable in the retail trade than larger ones. Some attention may be given to novelty and variety.

FOULBROOD IN BEES.

So important it is to be well posted on the two most important, and likewise most destructive, diseases of bees, that a full description of the diseases and their treatment is herewith given. These are taken verbatim from Bulletins Nos. 2 and 5 of the Michigan Apiary Inspection Division and were written by Michigan's former State Bee Inspector, Mr. B. F. Kindig.

AMERICAN FOULBROOD.

American foulbrood is an infectious disease of the larvae of the honey bee.

CAUSE.

The disease is caused by a microscopic organism similar in appearance and habits to some of the germs which cause disease in the human body. The organism is known as *Bacillus larvæ*.

SYMPTOMS.

To the beekeeper who is unfamiliar with this disease, usually the first symptoms apparent are a gradual weakening of the colony and the presence of a very unpleasant odor in the hive. In the very early stages of the disease it is recognized by an occasional brood cell capping being sunken and darker in appearance than the cappings of the adjacent cells. A part of these cappings may also have small holes in them, often ragged in appearance. Upon further examination it may be found that in a few uncapped cells the larvae have died and are decaying on the lower cell walls. Upon careful examination, the dead larval remains in all of the cells just mentioned will be found to be similar in shape and position, although they may vary somewhat in color. Soon after the death of the larvae it begins to take on a brownish appearance and the longer the larvae has been dead and the more it becomes dried down the darker is the color. When the remains have dried down to a thin scale on the lower cell wall the color becomes almost black. When larvae die from this disease the decayed remains tend to become quite gluey in their consistency. If a match or tooth-pick be inserted into the cell and a part of the remains drawn out it will be found to stretch out somewhat like glue. This quality is commonly spoken of as ropiness and is often considered the diagnostic symptom of this disease. However, in making a diagnosis these four factors should be present:

- (1) The larval should lie on the lower cell wall.
- (2) The color should be brown or black.
- (3) The consistency of the larvae should be ropy unless dried down into a black hard scale.
- (4) The odor should be repulsive, inasmuch as it is commonly described as smelling like a glue pot.

Even in a very mild case of disease the first three symptoms should be apparent while the fourth (the odor) may not be so noticeable if only a few cells are affected. Whenever there is the slightest doubt as to the diagnosis of disease a sample of the comb containing the diseased larvae should be sent to the U. S. Department of Agriculture, Bee Culture Labor-

atory, Washington, D. C., where a microscopic examination will be made. Upon application, the department will gladly furnish a mailing case for sending in samples of comb for disease identification.

TREATMENT.

The only successful treatment for American foulbrood consists in removing the bees from the combs and hives and placing them in a clean hive without combs but in which the frames are fitted with full sheets of foundation. There are slight variations in the method of treatment according to the season of the year. These slight differences will be fully discussed under the method of treatment for the particular season. If it is at all possible to avoid it, a diseased colony should never be treated in the same yard with colonies that are not diseased. Wherever possible, the diseased colonies should be removed a mile or more from the yard, given the proper treatment and then returned to the yard. Whenever treating for disease one should give due consideration to the location of other beekeepers in order that disease may not be spread by robbing during the process of treatment.

SPRINGTIME TREATMENT.

When it is desired to treat the bees in the spring as early as possible and when more than one colony is diseased, it is possible to save the brood of each colony excepting the last one treated by the following plan:

Pick out from among the diseased colonies the ones which are deemed strong enough to stand the shock of treatment during the month of May. Each of these colonies should be transferred into clean hives with full sheets of foundation and the brood which they had should be placed on one or more of the weaker diseased colonies. In the process of transferring, the diseased colony is placed two feet or so to the back side of where it formerly stood. The hive into which it is desired to transfer the bees is placed on the old stand. After placing a newspaper in front of the hives to catch any honey that may drip, then taking one frame at a time the bees should be brushed upon the paper in front of the new hive. Care should be used to see that the queen enters the new hive. After she is in, a queen-guard or queen and drone trap should be placed on the entrance to prevent the swarm from absconding. After all the bees have been removed, the combs may be placed on another diseased colony, as said before. If only one colony is affected then the combs should be buried deeply or burned. In all of the manipulations concerned with the handling of disease every precaution must be used in order that no robbing may take place. If any robbing occurs it is quite certain that each colony concerned in the robbing will later become diseased. For this reason it is customary to treat diseased bees late in the evening after the bees quit flying. If it is necessary to treat them in a yard where there are healthy colonies, then the entrances to all the adjacent healthy colonies should be closed with a screen so that in the excitement and confusion incident to transferring if any of the bees from the diseased hive attempt to enter they will be unable to do so. If it is impracticable to remove the bees from the yard for treatment, then the hives should be moved a foot or more each day until the diseased hives are as far as they can be placed in the yard from other colonies. Many beekeepers who have treated disease from year to year find it advisable to use a screened cage about six feet square and six feet high. They perform all of the work of transferring within this cage. In this way it is impossible for robbers to enter or for any of the bees of the colony to enter another hive. Whenever bees are disturbed as in transferring they fill their honey sacs with honey. In case it is a diseased colony the honey which they carry may transmit disease to any colony which such bees may enter. It is, therefore, very essential that all of the bees of a diseased colony be kept together. Colonies which are strong enough to admit of treatment in the month of May should build up and store a satisfactory amount of honey during the following honeyflow.

SUMMER TREATMENT.

Weak colonies on which the brood was stacked from the colonies treated in May, or other colonies which were too weak for treatment at that time, should be treated during the first few days of the main summer honeyflow, which in this State is either the basswood or clover flow. The same method of treatment should be followed as described previously, excepting that in case some colonies are not strong enough at that time to produce surplus honey, then, two or more colonies should be united at the time of treatment. It is not advisable to handle colonies in such a way that the surplus honey crop is entirely sacrificed. If an increase in the number of colonies is desired, it can be made in the latter part of the clover flow with but very slight sacrifice in the honey crop. The brood from five or six treated colonies can be piled upon one diseased colony and after three weeks when all of the brood is hatched, then the remaining colony should be treated. Whether or not all of the colonies are to be treated at the beginning of the main honey flow is optional with the beekeeper. If they are all treated at that time all frames containing brood must be burned or buried at once. If some of the diseased colonies are still weak it is probably best to pile the brood from those that are strong enough on them and arrange to treat three weeks later. However, when treatment is delayed until three weeks after the beginning of the honey flow in some instances not sufficient time is left for them to store honey enough for their needs. In this case they will have to be fed later.

FALL TREATMENT.

It occasionally happens that a colony which becomes infected in the spring may not be discovered until after the clover honey crop has been gathered. In general, it is not advisable to treat bees when there is no honey flow. The danger of robbing under such conditions is very much greater and feeding must be restored to in order to keep the colony alive. Late cases of infection may be treated during the month of October after brood rearing has practically ceased. The method of treatment is the same as described before, excepting that the bees are transferred into a hive without frames. They should be left in this hive for at least 48 hours. At that time the beekeeper should carefully remove the hive body from the bottom board. A hive body full of combs of honey taken from a healthy colony should be set in its place. Then the empty hive body with the bees should be set on top and jarred slightly. The bees will then take possession of the combs and honey and the empty hive body may be removed.

FEEDING IN CONNECTION WITH TREATMENT.

When it is desirable to treat very early in the season it is occasionally necessary to resort to feeding in order to get the foundation drawn out and to get brood rearing under way as quickly as possible. Realizing that the bees carry with them a supply of honey which is sufficient for their food for several days, it is not necessary to do any feeding until two or three days after treatment. It is very fortunate that in the digesting of the disease-carrying honey which the bees have in their honey sacs at the time of treatment, all danger of disease is eliminated. When bees are placed on foundation they very rapidly use up the honey which they have with them in the secretion of wax for comb building. For this reason it is not advisable in treating disease to give the colony a set of drawn combs. When this is done they deposit the honey which they carry with them in the cells and part of it is fed to the young larvae which they proceed to rear. Thus the disease which was present in the old hive is continued in the new one. When it is necessary to feed, the use of a Boardman entrance feeder or an Alexander bottom board is very convenient. If these are not at hand a very efficient feeder can be made by punching a number of fine holes in the lid of a friction top pail. This should be filled with syrup and inverted directly over the frames. The bees will then suck out the syrup.

DISPOSAL OF WAX AND HONEY.

Where only a small number of colonies are treated the best means of disposal of the frames and honey is to burn or bury them. In cases where a large yard is quite generally diseased it then becomes advisable to save as much of the equipment as possible. After the brood has been allowed to emerge as previously mentioned, then the hive bodies of combs should be removed to a bee-tight building. There the honey should be extracted at once. The honey may be used for making honey vinegar. It is not desirable to sell this honey as it may be exposed by the purchasers in such a way that bees may secure some of it and thus carry the disease to their own hives.

After extracting, unless a very cold cellar is available for storing the combs, it is necessary to cut the combs out and melt them at once because of the danger of wax moths at that season. No one should ever attempt to ship diseased combs to a foundation factory for rendering, excepting during the months of December, January and February. When combs are packed in a barrel and shipped, very often honey leaks out upon the floors of the cars or in the freight house and becomes accessible to the bees of the vicinity. This practice is forbidden by law in most states including Michigan.

After disposing of the combs and honey the frames should be boiled for not less than five minutes in a solution made from one can of concentrated lye to six gallons of water. Before placing the frames in this solution the wax and propolis should be carefully removed. After boiling, the frames should be thoroughly rinsed in a tub of clear, warm water. The hive bodies, super covers and bottom boards, should be thoroughly scraped to remove all particles of wax, honey and propolis. Then they should be gone over with a flame of a blow torch and the surface scorched until no germs can remain alive. Ordinarily supers and hive bodies are more easily sterilized by piling them up-side-down as high as one can conveniently reach and burning a small handful of straw or paper on the inside. Care must be exercised else the whole pile of supers will be burned up. A hive cover should be convenient for putting over the top to stop the blaze.

It must be realized that there is grave danger in the handling of diseased material unless every precaution is taken to prevent robbing. The extractor should be thoroughly scalded out after extracting diseased honey. If possible the extractor should be taken to where it may be turned up-side-down and a steam hose turned into it with considerable pressure for at least 15 minutes. If the wax is rendered, the slumgum and the water used in wax rendering should be buried after the bees have quit flying in the evening. All vessels or tools which come in contact with the disease must be thoroughly disinfected. If the above directions are followed carefully much valuable material may be saved. If not, foulbrood will be scattered far and wide over the adjacent territory.

METHODS OF SPREAD.

American foulbrood is commonly spread through carelessness on the part of someone. If carelessness on the part of beekeepers could be eliminated the problem of controlling foulbrood would be very much simplified. Weak diseased colonies may be robbed out because the entrances have not been contracted to a point where they can defend themselves. Dead diseased colonies are robbed out because the beekeeper carelessly leaves such colonies exposed in the bee-yard. It is a beekeeper's business to know whether any colonies are dead or weak, and it is his business to take care of them so that they may not be a menace to the neighboring beekeepers. The careless exposure of disease-carrying honey and the like is criminal and the offender should be punished by nothing less than confinement in the county jail. Often honey houses and other places where diseased honey and combs are stored have cracks in the doors or windows or the siding does not fit properly and whatever is contained therein is exposed to all of the bees in the territory. Often hives in which the colonies have died from disease are sold either through ignorance of the seller, or as has been amply demon-

strated, because his sense of right and justice has never been properly developed. A careful survey of conditions in Wisconsin showed that a large part of the spread of foulbrood was directly traceable to the selling or moving of diseased hives or equipment. The feeding of honey, a part of which was extracted from a diseased colony, causes an outbreak of disease wherever such honey is fed. It is not always possible to know whether or not some of it may have come from a diseased hive even though no disease is known to be present in the bee-yard. Some of the honey in the yard may have been stored from honey robbed from a diseased colony in the neighborhood.

BEE-YARD SANITATION.

The bee-yard practice must be such as to prevent robbing.

Frames of honey should not be taken from one colony and given as food to another colony.

A diseased colony should never be opened when there is the slightest danger of robbing.

Diseased colonies should be removed from the yard as soon as discovered and treated before returning them.

Carelessness, ignorance and malice are at the bottom of most of the spread of disease.

Do not use equipment from an unknown source without seeing to it that it cannot carry disease.

When a colony shows disease every frame connected with that colony must be destroyed. Some have erroneously judged that those frames which do not have dead larvae in them are suitable for further use.

In purchasing bees buy them in combless packages, not on drawn combs, unless there has been no disease among the bees for at least one year. The selling of diseased bees contributed largely to the spread of disease in Michigan.

Every super and every frame should be numbered to correspond with the hive on which it belongs and should be used there and nowhere else. If this suggestion is followed, extracted honey producers will find that foulbrood is just as easy to control in their yards as in the yards of comb honey producers.

EUROPEAN FOULBROOD.

European foulbrood is a bacterial disease which causes the death of the larvae of workers, queens and drones. It attacks them normally when they are about three days old and usually kills them before the cells are capped. The disease is quite variable in its severity; in some cases most of the uncapped larvae are affected, while in other colonies or under different conditions of season or honeyflow, but very few larvae may be attacked.

DISTRIBUTION.

European foulbrood is found in nearly all sections of the country, and in Illinois is prevalent in Central and Northern Illinois. Several years ago Dr. E. F. Phillips of the Bureau of Entomology, United States Department of Agriculture, called the attention of the writer to what seemed to be a striking coincidence, in that European foulbrood seemed to be particularly virulent on the poorer types of soil. The truth of this statement seems to be well borne out in the distribution of the disease in the various counties. While the disease is frequently met with on the heavier types of soil, yet it appears as a serious menace largely on the lighter soils where there is but little incoming nectar during the spring and early summer months. There are many counties in the State from which the disease has not been reported. This should not be construed to mean that such territories are immune from the malady. On the contrary, it seems to be purely an accident that this trouble has not appeared in many of these counties.

PREDISPOSING CONDITIONS.

As noted above, areas in which there are but few nectar-secreting flowers during the early part of the season seemed to be favorable for the development of the disease. As Italian bees are essential for the control of this disease, it therefore follows that in those communities where the black bees predominate European foulbrood is particularly serious. It has also been noted that the poor wintering of bees is exceedingly favorable to rapid progress of the disease. Those colonies are particularly susceptible which are weak in numbers and slow to build up either because of insufficient strength or because of the presence of a failing queen.

STRENGTH OF COLONY IN RELATION TO DISEASE.

Strong colonies of bees attempt to eradicate the disease from the hive by carrying out the dead larvae. This reminds one of the reaction of a strong colony to the presence of wax moths. Weak colonies seem to make but little effort to clean out the diseased larvae as they appear. The carrying out of the dead larvae seems to be an important factor in retarding the spread of the disease within the colony. Nurse bees have often been observed sucking the juices from the bodies of the dead larvae. Doubtless the nurse bees, because of their contamination with the bacteria form the principal agency in the dissemination of the disease within the hive.

Very little is definitely known regarding the spread of the disease from hive to hive or from one apiary to another. It has been definitely shown, however, that the disease can be transferred by the agency of the honey taken from the diseased colonies.

DIAGNOSIS.

The larvae are first affected by European foulbrood while they are curled up in the backs of the cells adjacent to the midrib of the comb. Frequently the larvae seem to move slightly before death and dead larvae change in color from pearly white to gray or yellow, and if permitted to remain in the cells they may become a yellowish brown or brown in color. The larvae do not adhere tightly to the cell walls. In serious cases there is usually a decided odor. There is but slight ropiness, if any at all. Queen, worker, and drone larvae seem to be equally susceptible to the disease.

In case of any doubt in diagnosis of disease, write to the Bee Culture Laboratory, Department of Agriculture, Washington, D. C., asking for a box in which to mail a sample of the diseased comb. The comb should not be wrapped in waxed paper nor mailed in tin containers.

TREATMENT.

During the past ten years the methods of treatment for European foulbrood have been changed quite radically. The transferring of the bees from the diseased hive is no longer advocated.

E. W. Alexander of New York and Dr. C. C. Miller of Illinois, demonstrated conclusively that the destruction of combs and the loss of brood were unnecessary in treating this disease. Dr. E. F. Phillips has summed up the whole matter of preventive measures: "The practices of good beekeeping are those which result in the eradication of European foulbrood."*

Every beekeeper should look forward to the possibility of European foulbrood becoming epidemic in his apiary. Preventive measures are therefore indicated rather than awaiting the coming of the disease and then attempting to remedy the situation. The following points are particularly important in this connection: Young queens, an abundance of food, suitable winter protection, Italian blood, and strong colonies.

In combating the disease after it has appeared, the queens of the diseased colonies should be killed and Italian queens of known resistance should be introduced as soon as the bees have had an opportunity to free the combs from all dead larvae. The length of time required for removing the

dead larvae depends upon the race of bees and strength of the colonies as well as the amount of infection present. If colonies are weak, it is frequently desirable to unite two or more colonies. The uniting of two weak discouraged diseased colonies frequently results in a complete change of morale and a quick cleaning up of the diseased material.

In those apiaries where most colonies are headed with resistant stock, it is unnecessary to send away for queens. Ripe queen cells from the best queens may be introduced into the colonies at the time the old queens are killed or a few days later, depending upon the severity of the disease. If the cells are introduced some time after the removal of the queens, then a careful examination of the combs must be made and all queen cells removed before introducing the ripe cells. Negligence in this matter may result in a hopelessly queenless colony due to the destruction by the bees of the cell introduced and by the blasting of the cells reared by the colony because of the disease present.

In connection with the treatment for disease, beekeepers frequently find it advantageous to feed a thin syrup at frequent intervals. After requeening all diseased colonies the beekeeper should keep very close watch of the performance of the various queens. He should begin rearing young queens from those queens which seem to produce colonies most resistant to the disease. The beekeeper should not depend entirely upon purchasing queens from regular queen breeders. He should learn to rear his own queens from those which he knows are fully capable of carrying their colonies through the season without a severe outbreak of disease. The vigor of a queen seems to be impaired by shipping through the mail. Vigor is of exceeding importance in queens in apiaries where disease is present.

*Farmers' Bulletin 975, "The Control of European Foulbrood," by Dr. E. F. Phillips.

LIST OF MEMBERS OF THE ILLINOIS STATE BEEKEEPERS' ASSOCIATION FOR 1925.

- Abel, Chas. F., Cazenovia.
Adams, Edith, Earlville.
Adams, Ed., Strawn.
Adams, G. M., Arlington Heights.
Aigley, Dr. J. E., Farmington.
Aikman, H. L., Farmersville.
Allen, L. R., Carbondale.
Almond Bros., Libertyville.
Amacker, C. F., Winfield.
Ambrose, L. W., White Heath.
Anderson, Roy, Chicago.
Anderson, C. R., Chatham.
Anderson, C. F., Morris.
Anderson, F. P., Anna.
Anderson, Joe, Carbondale.
Anderson, L. H., Elgin.
Annear, O. B., Mulkeytown.
Annear, Roy, Mulkeytown.
Armentrout, E. C., Irving.
Armstrong, Andrew, Johnson City.
Armstrong, W. H., El Paso.
Arnould, Elliott, Compton.
Arrowsmith, Annie, Gibson City.
Arvis, J. D., Lilly.
Augenstein, A. A., Dakota.
Aukes, W., German Valley.
Baker, Chas. F., Cazenovia.
Baker, Wm., Forest.
Baldwin, Walter, Harrisburg.
Balmes, Geo. H., Wilmette.
Baltimore, Guy, Woodhull.
Bangs, E. H., Chicago.
Banko, Mike, Valier.
Barnett, S. F., Irving.
Barr, C. W., Gardner.
Barnett, Edw. E., La Grange.
Bartelt, Geo. A., West Chicago.
Bartelt, J. W., Geneva.
Bartholomew, A. L., Glenview.
Baxter, Dr. A. C., Springfield.
Baxter, E. J., Nauvoo.
Baymilder, Dr. Minnie, Abingdon.
Beauman, Guy, Tunnell Hill.
Beaver, Wallace R., Lincoln.
Beck, Geo. S., Evanston.
Beer, Robert, Roanoke.
Beglund, Wm., Geneseo.
Beier, Herman, Normal.
Bell, Alvin, Ridgeway.
Bell, B. F., Kingston Mines.
Bell, Gordon, Mazon.
Bellatti, Fred F., Mt. Pulaski.
Belt, F. R., Canton.
Bender, C. F., Newman.
Benner, Fred, Elgin.
Bennington, Joe, Low Point.
Benton, T. E., Johnson City.
Berger, John, Carbondale.
Berry, E. F., Taylorville.
Beuster, Wm., Kewanee.
Beyers, Henry C., Decatur.
Biesicker, H. L., Monticello.
Bigel, Wm., Barrington.
Billman, J. F., Harrisburg.
Bilski, S. M., La Grange.
Binder, J. L., Marshall.
Bishop, Frank, Taylorville.
Black, John, Kewanee.
Black, Wright, Stonefort.
Blades, Lloyd, Simpson.
Blocher, D. J., Pearl City.
Blume, W. B., Chicago.
Boberg, Ed., Cambridge.
Bock, Henry, Beason.
Bodenschatz, J. A., Lemont.
Boswell, A. O., Marion.
Botterbush, Henry, De Soto.
Bowald, John, Secor.
Bowen, C. E., Lyndon.
Bowers, A. S., Lovington.
Bowman, Chas., Poplar Grove.
Boyd, C. J., Anna.
Boyd, E. C., Anna.
Boyd, J. J., Cobden.
Boyd, Sen. Randolph, Galva.
Boydaton, A. R., Cameron.
Boyer, John, Hanna City.
Boyles, J. C., Whittington.
Braun, H. H., Williamsville.
Brelsford, W. H., Kenny.
Brem, Joseph, East St. Louis.
Brenneman, A. I., Hopedale.
Bridgeford, Fred, Aledo.
Briggs, F. E., Arlington Heights.
Brigham, Wm., Bloomington.
Bright, John, Normal.
Brodbeck, P. M., Evanston.
Brooks, E. B., Liberty.
Brown, Carl E., Woodhull.
Brown, Chas. W., Aledo.
Brown, Ed., Woodhull.
Brown, R. W., Oneida.

Bruner, Bee Man, Chicago.
 Bryan, H. J., Normal.
 Bryant, E. J., Elgin.
 Buckner, J. L., Buckner.
 Bueche, C. F., Elgin.
 Bunker, D. A., La Fox.
 Burger, D., Decatur.
 Burgess, G. O., Bement.
 Burkland, Carl, Elgin.
 Burkey, Harmon, Murphysboro.
 Burnett, A., Lee, Rock Island.
 Burnett, Rollie, Lowder.
 Burtis, John C., El Paso.
 Burton, W. R., Whittington.
 Butow, R. M., Hubbard Woods.
 Bystedt, A., Kewanee.
 Cable, Geo. S., El Paso.
 Cale, G. H., Hamilton.
 Campe, F. O., Barrington.
 Carlson, Christ, Gardner.
 Carlson, P. A., Galva.
 Carnes, Jay, Woodhull.
 Carpenter, Michael, Cortland.
 Case, C. W., Rock Island.
 Casper, Norman W., New Burnside.
 Chamberlin, Porter, De Kalb.
 Chambers, J. O., Pierson.
 Chamness, A. E., Cartersville.
 Clark, Frank, Ridott.
 Clabaugh, C. E., Odin.
 Clausson, Frederick, Oregon.
 Clausson, S. S., Oregon.
 Clawson, W. A., Owaneco.
 Claypool, Geo., Marshall.
 Claypool, Osby, Marshall.
 Clayton, Roy, W. Frankfort.
 Clifford, Irl, Altona.
 Cline, Chas., Irving.
 Clower, H. L., Morrisonville.
 Coll, E. F., Cambridge.
 Coker, Amos I., Jacksonville.
 Concidine, Frank, De Kalb.
 Concidine, Roy, Elva.
 Connett, Roy, Marion.
 Cook, B. F., Downers Grove.
 Cooper, F. M., Richview.
 Copher, Carl, Marion.
 Coppin, Aaron, Wenona.
 Cornelius, W. H., Dow.
 Covington, L. W., Stonington.
 Crain, Geo. F., Cartersville.
 Crawford, Wm., Benton.
 Creet, C. H., Reynolds.
 Criley, Elmer, Thompsonville.
 Crockett, W. E., Monmouth.
 Cronk, H. M., Chicago.
 Crosby, James M., Momence.
 Crum, F. O., Palmyra.
 Cruzan, J. W., Humboldt.
 Cunningham, J. C., Streator.
 Curtiss, L. W., Gladstone.
 Cushman, Samuel, Chicago.

Cyka, J. F., Elgin.
 Dadant, C. P., Hamilton.
 Dadant, H. C., Hamilton.
 Dadant, M. G., Hamilton.
 Dadant, L. C., Hamilton.
 D'Arcy, Jos. A., Chicago.
 Darnell, H. C., Eureka.
 Darr, Ed., Ewing.
 Davidson, Ed., Farmington.
 Davis, Clay T., Braymer, Mo.
 Davis, Harry, Marshall.
 Davis, Mrs. Lane, Evanston.
 Davis, Ward O., Eldorado.
 Dean, D. H., Congerville.
 Demaray, Mrs. Maude, Elmhurst.
 Denning, James E., Joy.
 Derricks, A. P., Kenny.
 Desort, Frank, Lincoln.
 Devillez, Fred, Harrisburg.
 Devons, Philip, Ridgway.
 Devore, C. H., Lexington.
 De Werff, H. A., Benton.
 Dillon, John B., Benton.
 Dingledine, Louis, Eureka.
 Dollins, E. D., Benton.
 Dorris, W. S., Harrisburg.
 Downs, W. A., Easton.
 Duerrstein, C. W., Galena.
 Dulleck, Frank, Spring Grove.
 Duckwall, W. G., Jacksonville.
 Duffield, Raymond, Illinois City.
 Dullock, Frank, Spring Grove.
 Dungan, Chas. F., Brimfield.
 Dungan, Leonard, Illinois City.
 Dunker, Wm. H., Woodstock.
 Durston, J. J., Irving.
 Ebens, John, Oregon.
 Eckhardt, W. G., DeKalb.
 Egbert, W. C., Aledo.
 Eisemann, Chas. V., Chicago.
 Eisenbise, Ira B., Lanark.
 Eldred, M. G., Bartlett.
 Elliott, W. T., Marion.
 Engel, John H., Danvers.
 Eldred, M. G., Chicago.
 Elkins, W. E., Cambria.
 Emmons, Frank, Havana.
 Enlow, Claude, Zion.
 Enslow, Fred, Rochester.
 Enslow, F. A., Kewanee.
 Erb, J. W., Naperville.
 Ericson, H. A., Galva.
 Everett, Wilham H., Mount Pulaski.
 Eversoll, John, Scalesmound.
 Fager, G. E., Anna.
 Fairbank, R. L., West Chicago.
 Faist, John, Freeport.
 Fakes, M. R., Carbondale.
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 Kennel, Geo. W., Metamora.
 Kennett, O. W., Ohlman.
 Kenser, John, Strawn.
 Kenyon, J. F., Low Point.
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 Kettering, Frederick, Monmouth.
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 King, Leonard, Ernest.
 King, L. A., Ozark.
 Kirch, Michael, Congress Park.
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 Koehler, Edwin, Itasca.
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 Kommer, Elmer, Woodhull.
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 Koritz, J. N., Buckley.
 Kostenbader, Mabel M., Sciota Mills.
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 Krueger, Gust., Geneseo.
 Kruse, Chas., Paris.
 Kruse, Karl, Paris.
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 Ledbetter, J. A., Cambria.
 Lee, Lewis, Breeds.
 Lee, Walter, Witt.
 Lefler, F. M., Hamilton.
 Lehman, Ed., Peoria.
 Lemaire, E. A., Basco.
 Lemasters, Mrs. J. S. W., Frankfort.
 Lenny, A. L., East St. Louis.
 Lewis, R., Havana.
 Lewis, W. A., Havana.
 Light, W. F., Leaf River.
 Lind, M. H., Bader.
 Lindburg, John, Mathersville.
 Linder, Walter, New Boston.
 Linn, A., Martinsville.
 Little, Frank A., Hampshire.

- Livsey, John, Montgomery.
Lloyd, J. H., Carthage.
Locke, Donald, Glen Ellyn.
Long, E. J., Assumption.
Long, O. S., Orion.
Love, S. H., Milan.
Lovgren, John, Galva.
Lowry, W. S., Ewing.
Lund, Elias, Norwood Park.
Lundeen, A. C., Paxton.
Lyman, W. C., Downers Grove.
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McCaffery, W. H., Freeport.
McCarver, R. A., Cartersville.
McClure, J. H., Roadhouse.
McClure, S. R., Monticello.
McColl, J. G., Vienna.
McDaniels, J. E., Gerard.
McDermatt, Earl, Whittington.
McIntyre, G. C., Aledo.
McKendrick, A. L., Silvis.
McKendrick, J. W., Silvis.
McKillop, Dan, Lynn Center.
McKinley, C. D., Havana.
McLaughlin, E. E., Carbondale.
McMillan, Dr. P. A., Tampico.
McNelly, B. A., Vienna.
McWhorter, H. E., Kilbourne.
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Mahoffey, Roland, Cambridge.
Mann, Louis, Lincoln.
Mansfield, James O., Elgin.
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Marshall, Wm., De Kalb.
Martin, M. M., Caledonia.
Martin, Ray, Hillsboro.
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Meineke, E., Chicago.
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Meredith, R. C., Whittington.
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Meyers, Richard, South Holland.
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Williams, Loren, Ewing.
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Wingo, Aaron, Benton.
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Wunder, John, Chicago.
Wyman, Ray, Freeport.
Wyne, E. C., Lintner.
Yender, Louis A., Naperville.
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Zadel, Fr., Witt.
Zeigler, Emil, Taylor Ridge.
Zeller, Katherine, Metamora.
Zilligen, Geo. W., Harvey.
Zimmerly, F. E., Elgin.
Zook, J. D., La Grange.
Zweilly, C. W., Willow Springs.

INDEX.

	PAGE
Allen, J. R.....	14
Annear, Roy I.....	73
Arvin, James D.....	74
Association Bill.....	80
Bees in 1200 Acres of Apples.....	25
Bell, Gordon.....	65, 74
Bishop, Frank.....	73
Bryant, E. J.....	74
Burrill, A. C.....	46
Cale, G. H.....	25
Champaign County Association.....	59
Clark, Frank.....	66
Clausen, S. S.....	74
Constitutions and By-Laws.....	76
Costs of Selling Honey.....	22
Cook County Association.....	64
Dadant, C. P.....	19
Dadant, M. G.....	12
De Kalb County Association.....	58
Fischer, Benjamin H.....	72
Foulbrood in Bees.....	84
Foulbrood Law.....	78
Fruit Growing and Beekeeping.....	40
Gill, A. G.....	64
Glass, Glenn L.....	57
Grading Rules.....	81
Grundy County Association.....	65
Hardesty, Wm. T.....	58
Hendrick, J. T.....	59, 68
Henry County Association.....	62
Honey from Long Tubed Flowers.....	46
How Bees "Make" Honey.....	32
Huggans, Court D.....	57
Inglemose, H. A.....	70
Kennett, O. W.....	72
Kelley, Otis.....	68
Kildow, A. L.....	67
King, Harry L.....	70
Kommer, Elmer.....	64, 70
Kruse, Chas. A.....	69
La Fonn, John.....	70
List of Members of State Association.....	91
Lingenfelter, Wayne.....	71
Livingston County Association.....	58
McLean County Association.....	65
Meredith, R. C.....	73
Milum, V. G.....	6
Minutes of 25th Annual Meeting.....	14
Montgomery County Associatoin.....	66
Morrill, Ross.....	70
Northern Ill. and Southern Wisconsin Association.....	57

Officers of State Association.....	7
Ogle County Association.....	57
Osborn, Wesley.....	66
Park, O. W.....	32
Pellett, Frank C.....	40
President's Annual Address.....	9
Report of Chief Apiary Inspector.....	66
Reports of Deputy Inspectors.....	68, 75
Resolutions.....	15
Ritler, E. W.....	71
Root, H. H.....	22
Saline and Gallatin Association.....	61
School Children and Honey.....	16
Secretary's Report.....	12
Seibel, Elizabeth.....	65
Smith, Paul R.....	71
Some Beekeeping Experience.....	19
Stephenson County Association.....	65
Thomas, Alfred E.....	65
Tudor, C. H.....	58
Tyler, S. A.....	73
Wallamhs, Wm. J.....	74
Warren County Association.....	57
Watt, Geo. R.....	73
Weaver, Everett.....	62, 68
Woodford County Association.....	64
Wooldridge, J. R.....	9

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